PROPOSED PEPCO PLANT

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HEARING

BEFORE THE

SPECIAL SUBCOMMITTEE

TO INVESTIGATE THE PROPOSAL OF POTOMAC ELECTRIC POWER CO. TO ERECT A STEAM PLANT ON THE POTOMAC RIVER IN LOUDOUN COUNTY, VA.

OF THE

COMMITTEE ON THE DISTRICT OF COLUMBIA UNITED STATES SENATE

EIGHTY-FOURTH CONGRESS

FIRST SESSION

ON

PROPOSAL OF THE POTOMAC ELECTRIC POWER CO., OF WASHINGTON, D. C., TO ERECT A STEAM PLANT ON THE POTOMAC RIVER IN LOUDOUN COUNTY, VA.

NOVEMBER 10, 1955

Printed for the use of the Committee on the District of Columbia

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SPECIAL SUBCOMMITTEE TO INVESTIGATE THE PROPOSAL OF POTOMAC ELECTRIC POWER CO. TO ERECT A STEAM PLANT ON THE POTOMAC RIVER IN LOUDOUN COUNTY, VA.

WAYNE MORSE, Oregon, *Chairman*

PAT McNAMARA, Michigan	J. GLENN BEALL, Maryland

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PROPOSED PEPCO PLANT

THURSDAY, NOVEMBER 10, 1955

UNITED STATES SENATE,
SPECIAL SUBCOMMITTEE TO INVESTIGATE THE PROPOSAL OF POTOMAC ELECTRIC POWER CO. TO ERECT A STEAM PLANT ON THE POTOMAC RIVER IN LOUDOUN COUNTY, VA.,
OF THE COMMITTEE ON THE DISTRICT OF COLUMBIA,
Washington, D. C.

The special subcommittee met, pursuant to call, at 10:05 a. m., in the District committee room, United States Capitol Building, Senator Wayne Morse (chairman of the subcommittee) presiding.

Present: Senators Morse and Beall.

Also present: Hon. Howard W. Smith, a Representative in Congress from the Eighth District of Virginia.

William P. Gulledge, counsel, and Murray W. Weight, assistant counsel.

Senator MORSE. The hearing will come to order.

I think the best way to open the hearing is to read into the record a letter of September 20, 1955, that I sent to Senator Matthew M. Neely, chairman of the Senate Committee on the District of Columbia. [Reading:]

MY DEAR SENATOR: The proposal of the Potomac Electric Power Co. to construct and operate a steam plant in Loudoun County, Va., on the south bank of the Potomac River has recently come to my attention. I view this proposal with grave concern because it is my understanding that the steam plant would be constructed above Great Falls near the source of the water supply for the District of Columbia and in the potential reservoir area of a Federal multipurpose dam that might be urgently needed in connection with the future growth of our Nation's Capital.

Present and future residents of the District of Columbia depend upon the Potomac River as a primary source of water for the area. Consequently, any installation which might conceivably impair the water supply of the District or which could contribute to pollution of the river must be subjected to thorough scrutiny.

It has been indicated that water from the Potomac would be used to cool the steam plant's condensers. Many people have expressed the fear that in times of low water the condensers would increase the temperature of the river so as to promote the growth of harmful bacteria. We have been waging a battle to eliminate pollution in the Potomac and we should be particularly vigilant with respect to any facility which might contribute further to the polluted condition of the river.

Under the law, the Chief Engineer for the Washington District is responsible for the water supply of the District of Columbia. He has requested Loudoun County and the Potomac Electric Power Co. officials to defer action on the proposed plant until further study can be made. The District of Columbia Commissioners have concurred in this request. The wisdom of the request is obvious.

It is not my intention to interfere with this private utility in providing sufficient electric service to the area; however, before any final decision is reached, I

feel that the company as well as all interested Government officials and agencies should thoroughly explore the possibility of establishing the plant at some alternative site where its operations would not adversely affect the water supply of the District of Columbia.

I respectfully request that you have an appropriate subcommittee of the Senate District of Columbia Committee investigate the steam-plant proposal at the earliest possible moment and that the subcommittee hold hearings to obtain the views of all interested officials including the Army engineers and appropriate health authorities.

I have a strong conviction that the construction of the steam plant at the point proposed by the Potomac Electric Power Co. would be contrary to the public interest and would add greatly to the critical problem of obtaining an adequate water supply for the rapidly growing population of the Washington metropolitan area. For that reason, I request that further action on the steam-plant project be delayed until the subcommittee's hearings and investigation have been concluded.

With kindest regards.

Sincerely,

WAYNE MORSE.

Apparently as the result of that letter this subcommittee was appointed by Senator Neely and the members were notified by letter of their appointment. I will also read into the record a press release dated September 21, 1955, from the office of Senator Matthew M. Neely. [Reading:]

Today Senator Matthew M. Neely, Democrat, West Virginia, chairman of the Committee on the District of Columbia, announced the appointment of a special subcommittee to investigate the Potomac Electric Power Co.'s proposal to build an electric steam plant on the Potomac River in Loudoun County, Va. The committee will be composed of Senator Wayne Morse, Democrat, Oregon, chairman; Senator Pat McNamara, Democrat, Michigan, and Senator J. Glenn Beall, Republican, Maryland.

Chairman Neely stated that he had received a request from Senator Morse to appoint a subcommittee to investigate the steam-plant proposal and that such committee hold hearings to obtain the views of all interested officials to determine, among other things, what effect this installation would have on the water supply of the District of Columbia.

Senator BEALL. Mr. Chairman, before you proceed, I would like to say, for the record, that while I was not here when that letter was written I heartily concur in your writing the letter. While some of us may, in neighboring States, naturally, have some selfish interests, I do think that we are all agreed a definite shortage of water exists in the District of Columbia, and I think our first objective should be to see that these 850,000 to 900,000 people receive sufficient water, and that nothing be done to handicap or to retard the present water supply.

As a matter of fact, we should be thinking now in terms of getting more water for the District of Columbia, rather than taking from it.

I congratulate you on having sent the letter. I think it is timely that we go into all of the phases of this project.

Senator MORSE. I simply want to say that I have received many protests and proposals and counterproposals on the matter. I do not know what the facts are. I know the best way to find the facts in a controversy such as this is to make an official record. That is why I asked for the appointment of a committee. I did not ask to be appointed the chairman of the committee. That was a gratuitous gesture. I thank Senator Neely.

I want to say that we are honored this morning in having seated at our table, and I invite him to participate as though he were a member of the committee, the Congressman from Virginia, known to all of us as the Judge, Congressman Smith. I want you to feel perfectly free, Congressman Smith, at any time to ask questions of any witnesses, as though you were a member of this committee. You have all of the courtesies of this committee at your disposal.

Mr. SMITH. Thank you so much. I am here merely as an observer. I would like to know what is going on.

Senator BEALL. Let me say that he has been a member of the District of Columbia Committee of the House ever since he has been in Congress, and that is a few years—a few years more than I have been here.

Senator MORSE. The first witness that I shall call is Gen. Thomas A. Lane, Engineer Commissioner of the District of Columbia. I understand he is to be accompanied by Mr. David V. Auld, Director, Department of Sanitary Engineering of the District of Columbia.

We are glad to see you, Commissioner. You have heard the letter that I read into the record, Commissioner Lane, explaining the background of this hearing. On the basis of that introduction you are invited to proceed in your own way to discuss this matter. When you have finished then the committee will ask you such questions as they care to.

STATEMENT OF GEN. THOMAS A. LANE, ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA, ACCOMPANIED BY DAVID V. AULD, DIRECTOR, DEPARTMENT OF SANITARY ENGINEERING, DISTRICT OF COLUMBIA

General LANE. Thank you, Mr. Chairman. I would like to proceed with an opening statement, on behalf of the Board of Commissioners of the District of Columbia, and then I shall be glad to answer any other questions you may want to ask.

The Commissioners of the District of Columbia have two principal interests in the public issues which have been raised with respect to the proposal to locate a new powerplant of the Potomac Electric Power Co. in Loudoun County, Va. On the one hand they have an interest in keeping the electric power rates in the District of Columbia low and therefore in keeping the operations of this utility company as efficient and economical as practicable. On the other hand, the District of Columbia residents are dependent for their water supply upon the Potomac River above the District boundaries. They are concerned about the quality and cost of this water and the adequacy of the supply. They are further interested in general plans for the development of the Potomac River for flood control, recreation, and other uses.

The specific problems related to the supply of water to the District of Columbia have been charged by the Congress to the Chief of Engineers. Therefore, the technical problems related to the water-supply problem will be presented to the committee by his representative. The problem of flood control, which has been brought home to us more forcefully through the experience of New England communities in the past summer, is a problem involving Federal policy and one on

which the representative of the Chief of Engineers will be prepared to advise this committee.

The Commissioners would like to express the view that the development of the Potomac River Valley in the best interest of all of the citizens of the area is a matter of great importance to all local residents and to our National Capital. The Potomac Electric Power Co. has a large stake in these future plans. We are confident that the immediate interest of the Potomac Electric Power Co. in securing the most efficient possible development of its plant can be reconciled with the community and national interest in sound long-range programs. We feel that one of the first requisites for the sound development of this river valley is the establishment of a firm, long-range Federal program; and we are therefore happy to see the interest being taken by this committee. We wish to assure you that all of the resources of our District of Columbia government will be available to assist you in exploring the problems related to this development.

That is the general statement of policy which I think, Mr. Chairman, is very much in line with your letter, as a matter of fact, in expressing our general interest.

I know there are a great many people who wish to testify today, and there will be a great amount of technical data which will follow. I shall be glad to answer any questions that you may have at this time.

Senator MORSE. Senator Beall?

Senator BEALL. General Lane, has the Corps of Engineers made a study of what effect or how much water would be used by the proposed powerplant?

General LANE. Yes; they have.

Senator BEALL. Tell us for the record—I am familiar in a general way with it—just how a powerplant takes water out and returns it to the river, and what percentage comes back and in what condition that water comes back into the river?

General LANE. The question of free cooling water is a matter of considerable importance in the economy of a powerplant. I am sure that the representatives of the company will testify in detail on this measure, but the plant can also be operated with a small amount of water by providing their own circulation in the cooling of the water, reducing the draft on the river, but that increases the cost of the power operation, so that any power company locating a plant will always seek, if possible, a free cooling water.

This cooling water is circulated through the plant and cools the turbines, the equipment in the plant. It is isolated in this circulation from the remainder of the plant operation and comes back to the river just as water being circulated through an automobile radiator might be run through the engine and then discharged back into the radiator.

So it has its own channels through the plant. Its temperature, of course, is raised markedly during the process. The only impurities that will be developed in any way would be due to the changes in the river water, the destruction of bacteria in the water, which might accumulate on the sides of the conduits.

I think there would be no other contamination of any kind of which I am aware, although I feel we shall have more expert testimony on this during the course of your hearing.

Senator BEALL. The impurities could be cleared. When you purify the water through the regular channels that would be taken care of?

General LANE. Yes; there would be no impurities introduced into it from the plant.

Senator BEALL. What I was really thinking about, though, is when you take the water and heat it, and then you cool it, some of it will be vaporized and go off into space, would it not? The water would go into vapor when you are cooling it, would it not?

General LANE. I do not believe there would be any appreciable losses involved, because the temperature rise is not in that range. The water circulates through and cools the equipment.

Senator BEALL. There would be no appreciable amount that would go off into vapor?

General LANE. There is no appreciable loss of water in terms of quantity in the process.

Senator BEALL. How long does it take water to go through a plant and then come back into the river and again be available for other purposes?

General LANE. I cannot tell you what the circulating time through the plant would be, but I would assume it would be a very short interval. We shall also have testimony today on the quantity used per day which is circulated through the plant.

Senator BEALL. You would rather somebody else give that quantity?

General LANE. Yes. I would like to say on this, Senator, that the district engineer of the Corps of Engineers, who is a representative of the Chief of Engineers, charged with procuring the water supply for the District of Columbia and its environs, has engaged consultants who have gone into this matter in detail, and he is prepared to present their testimony this morning. I am aware of those studies, and have been briefed on them in a general way, but I would not want to take the time to testify on them in particular.

Senator BEALL. That is all. Thank you.

Senator MORSE. Congressman Smith?

Mr. SMITH. No questions.

Senator MORSE. General, have the District of Columbia Commissioners taken any position on this request of Pepco to build this plant?

General LANE. The only position we took, we took at the time, I believe, of the zoning request and that was before the county commissioners. We asked them to defer until this matter could be investigated.

We have taken no position, Mr. Chairman, as to the suitability of their site, because the district engineer has been making studies, and has been in consultation with the company officials, and until their consideration was completed, that information placed before us, we did not feel that any official action should be taken. We felt that the differences could be reconciled and then agreement could be reached as to the proper location of the plant.

Senator MORSE. That material has yet to be officially put before the Commissioners?

General LANE. That is correct; yes, sir.

I think the first presentation of these studies, outside of the district engineer's own office, will probably be made this morning to your committee, sir.

Senator MORSE. What position, can you tell us of your own knowledge, if any, the Public Utilities Commission of the District has taken on the Pepco application?

General LANE. Mr. Chairman, may I ask on that, is there a Utilities staff representative here today? Are you prepared to testify on that?

VOICE. The only information I have is the need for additional generating facilities.

General LANE. There is an application before the Public Utilities Commission, Mr. Chairman, for approval of the construction of a plant to increase the facilities of the company.

So far as I am aware, no official action has been taken on that, and no advice to the company has been rendered on that. Is that correct, Mr. Dunn?

Mr. JAMES F. REILLY. It is before the Public Utilities Commission at the present time. My name is James Francis Reilly. I am counsel for the company. We specifically asked the Public Utilities Commission to withhold any action until your committee had had this hearing.

Senator MORSE. I have been out of town.

Mr. REILLY. I know you have.

Senator MORSE. I did not know what the present status of it was.

Mr. REILLY. I know that.

Senator MORSE. Mr. Auld, do you have anything that you wish to supplement?

Mr. AULD. I have some thoughts in the matter, but I would like to defer them until there has been an opportunity for the district engineer to present the technical data.

Senator MORSE. Thank you very much.

General LANE. Thank you.

The next witness is Col. Ray Adams, district engineer.

We are very glad to have you testify at this hearing, Colonel. You may proceed in your own way, subject to questions when you are finished. You are familiar with the general problem, the purpose of this hearing, and anything you can contribute to the hearing that you think will be of help to the committee will be very much appreciated.

STATEMENT OF COL. RAY ADAMS, DISTRICT ENGINEER, ACCOMPANIED BY SAMUEL T. FAVOR, ASSOCIATE AND MECHANICAL ENGINEER WITH CHAS. T. MAIN, INC., BOSTON, MASS.; DR. CHARLES E. RENN, JOHNS HOPKINS UNIVERSITY, BALTIMORE; BYRON BIRD, CHIEF, WATER SUPPLY DIVISION, WASHINGTON, D. C.; AND D. V. BIRRELL, CHIEF, ENGINEERING DIVISION, WASHINGTON, D. C.

Colonel ADAMS. Mr. Chairman, and members of the committee, I have several members of my staff with me this morning, and also the consultants whom I have engaged. I would like to have them come to the table.

Senator MORSE. We will be very glad to have you introduce them for the purpose of the record now.

Colonel ADAMS. Mr. Byron Bird, Chief, Water Supply Division, Washington, D. C.

Senator MORSE. We are glad to have you here.

Colonel ADAMS. Mr. Favor, Samuel T. Favor, associate and mechanical engineer in the firm of Chas. T. Main, Inc., and the headquarters of that firm is Boston, Mass. Dr. Charles E. Renn, of Johns Hopkins University, Baltimore, Md., and Mr. D. V. Birrell, Chief, Engineering Division, Washington, D. C.

Senator MORSE. We are very glad to have you gentlemen at this hearing. I will turn the presentation of your case over to Colonel Adams at this time.

You may proceed.

Colonel ADAMS. In the prepared statement which we have submitted for the record, I have included, by way of background for the record, quite a bit of information on the legislative assignment of responsibilities and authorities, according to which the Corps of Engineers operate the Washington aqueduct, the delegation of the responsibility to the district engineer, Washington District.

This is rather lengthy, and I would suggest, if the committee will permit, that I omit the reading of this lengthy background and get into the part of the prepared statement that pertains more strictly to the problem at hand.

Senator MORSE. Proceed in your own way.

Senator BEALL. It may be made a part of the record?

Senator MORSE. The record will show that Colonel Adams' entire statement is made a part of the record at this point.

(The prepared statement of Col. Ray Adams, district engineer, follows:)

STATEMENT BY COL. RAY ADAMS, DISTRICT ENGINEER, WASHINGTON DISTRICT, CORPS OF ENGINEERS, UNITED STATES ARMY

(1) By way of background, I shall summarize the following matters which appear pertinent:

(*a*) The legislative assignment of responsibilities and authorities according to which the Corps of Engineers operates the Washington aqueduct, and the delegation of the responsibility to the district engineer, Washington district.

(*b*) The master plan and authority for capital outlay.

(*c*) The relation between the Corps of Engineers and the District of Columbia government in the supply of water.

(*d*) The size of the Washington aqueduct operation.

(*e*) The character of the water treatment problem as it is today.

(2) *Legislation.*—(*a*) An act of the 31st Congress, 1st session, approved September 30, 1850, appropriated $500 to enable the War Department to make such examinations and surveys as necessary to determine the best and most available mode of supplying the city of Washington with pure water, to prepare a plan and an estimate of cost, and to report to the Congress at its next session.

(*b*) An act of the 32d Congress, 1st session, approved August 31, 1852, appropriated $5,000 to enable the President of the United States to make the necessary surveys, projects, and estimates for determining the best means of affording the cities of Washington and Georgetown an unfailing and abundant supply of good and wholesome water. (Under the direction of the President, this work was done by the War Department.)

(*c*) An act of the 32d Congress, 2d session, approved March 3, 1853, appropriated $100,000 to be expended under the direction of the President of the United States for the purpose of bringing water to the city of Washington. (Under the authority of the President, the construction was done under the direction of an officer of the Corps of Engineers selected by the President.)

(*d*) An act of the 35th Congress, 2d session, approved March 3, 1859, provided that the dams, aqueducts, water gates, reservoirs, and all fixtures and improvements connected therewith, which had been, or might thereafter be constructed by the United States should be placed by the President of the United States under the immediate care, management, and superintendence of a properly qualified officer of the United States Corps of Engineers to be appointed by the President and that the officer would act under the Department of Interior. The act provided that the engineer officer would have full power and control over the waterworks and that his decision on all questions in connection with it would be subject only to appeal to the Secretary of the Interior.

(*e*) An act of the 36th Congress, 1st session, approved June 25, 1860, appropriated $500,000 to be expended according to the plans and estimates of Captain Meigs and under his superintendence. The act abolished the Office of Engineer of the Potomac Water Works and provided that the duties of that Office should thereafter be discharged by the Chief Engineer of the Washington aqueduct. (Captain Meigs was the officer appointed by the President under the act approved March 3, 1859, and under the act of June 25, 1860, became Chief Engineer of the Washington Aqueduct.)

(*f*) A joint resolution of the Senate and House approved June 18, 1862 transferred the supervision of the aqueduct from the War Department to the Department of Interior.

(*g*) An act approved March 2, 1867, abolished the office of Commissioner of Public Buildings and provided that the Chief Engineer of the Army should perform all the duties then required by law of the Commissioner of Public Buildings and should also have the superintendence of the Washington aqueduct and all the public works and improvements of the Government of the United States in the District of Columbia unless otherwise provided by law. The superintendence of the aqueduct has remained the responsibility of the Chief of Engineers under the provision of this act.

(3) *Delegation to the district engineer.*—The superintendence of Washington aqueduct was assigned to the district engineer by command of Brigadier General Gillespie, the Chief of Engineers, by a letter of October 6, 1903, addressed to Lt. Col. Alexander M. Miller, the district engineer, which by authority of the Secretary of War directed him to relieve Lt. Col. Charles J. Allen, CE, of the works in his charge together with money, property, and records pertaining thereto. Lieutenant Colonel Allen was at that time Chief Engineer of the Washington aqueduct.

(4) *Authority for supplying water to Arlington and Falls Church.*—Public Law No. 119, 69th Congress, authorized the Secretary of War (now Secretary of the Army), in his discretion and subject to the approval of the Chief of Engineers, upon the request of the Board of Supervisors or Arlington County, Va., to permit the delivery of water from the Federal water supply pumping station at the Dalecarlia Reservoir to the Arlington County Sanitary District, created by an act of the General Assembly of the State of Virginia, of March 15, 1922.

Public Law 118, 80th Congress, 1st session, authorized the Secretary of War, in his discretion, on the recommendation of the Chief of Engineers, United States Army, and the Board of Commissioners of the District of Columbia, to permit the delivery of water to the town of Falls Church on request of the town council. The authorization includes the delivery of water to the town for furnishing adjacent areas as are now or shall hereafter be served by the town as well as serving the town itself. The act also extends the same authority to the Secretary to permit the delivery of water to any other competent State or local authority in the Washington metropolitan area in Virginia. Under the authority of this act, water is pumped from Dalecarlia to both Arlington County and Falls Church, and the area served includes some areas in Fairfax County adjacent to Falls Church which are served by the town.

(5) *Master plan and authority for capital expansion.*—The master plan of capital expansion of the system and the authorization for the construction of planned facilities are contained in House Document No. 480, 79th Congress, 2d session. The plan and program contained in this document were based on comprehensive studies and projections of population growth and per capita water consumption. The program of construction was developed to meet the water needs and at the same time be capable of being financed within the water revenues. Presently under construction, pursuant to House Document No. 480, are the Dalecarlia treated water pumping station; Little Falls diversion dam, and raw water intake and pumping station, and tunnel for the delivery of water to

Dalecarlia; and an additional high level reservoir for which a contract has just been awarded.

At this junction, a word about the Little Falls station is in order because it is particularly pertinent to the background in the problem at hand. For approximately 100 years water has been taken from the Potomac River at Great Falls, approximately 10 miles upstream of the District line. The water flows by gravity from Great Falls to Dalecarlia in two large conduits which lie under MacArthur Boulevard for a large portion of the way. One of these conduits is about 100 years old and the other was built in 1927. The capacity of the two conduits is not equal to the heaviest daily water consumption in summer months, and for several years supplementary water has been pumped from the C. & O. Canal near Dalecarlia in meeting the heaviest demands. The required annual maintenance of the conduits has been increasing significantly in recent years. We have no reserve to fall back on in the event a major failure should occur during the summer months, and we can foresee the time when maintenance costs will become excessive. With modern conditions it is more economical to construct a plant and pump from a nearby pumping station on the river than it would be to replace these gravity conduits. We, accordingly, placed the Little Falls station under construction in May 1955, with an initial firm capacity of 350 million gallons per day and an ultimate firm capacity of 500 million gallons per day. With the completion of this plant we will have a reserve capacity, and the capability of phasing out the gravity service when its maintenance becomes such that it will be cheaper to pump from Little Falls. Little Falls is approximately 1 mile upstream of Chain Bridge and about 9 miles below Great Falls.

(6) *Relation between Washington aqueduct and the District of Columbia.*—The overall water system of the District of Columbia and its environs may be considered to have two components—the supply component and the distribution component. The supply component is the Washington aqueduct, operated and controlled by the district engineer, Washington District, Corps of Engineers, United States Army, under the supervision of the Chief of Engineers, Department of the Army. The distribution division is the Water Division of the District of Columbia government, operated and controlled by the Dirctor of Sanitary Engineering, District of Columbia, under the supervision of the Board of Commissioners of the District of Columbia. The Washington aqueduct supplies treated water to the District of Columbia at its Bryant Street pumping station and three high-level reservoirs. From these points onward the District of Columbia pumps and distributes the water. The Washington aqueduct pumps water directly to the Pentagon, Fort Myer, and Navy Department buildings in Arlington, Va. The Washington District, Corps of Engineers, budgets annually for operating and maintenance expenses and authorized capital expansion of the Washington aqueduct. This budget is coordinated with the District of Columbia government and, when agreed to, is incorporated into the District of Columbia budget for presentation to the Bureau of the Budget. Obligations and expenditures by the Washington District for the Washington aqueduct are appropriated by the Congress and funded from the water revenues of the District of Columbia, which include payment by the Federal Government for service to Federal establishments whether served by the District of Columbia or directly by the Washington aqueduct. Very close continuing coordination is maintained between the office of the Engineer Commissioner of the District of Columbia and the Sanitary Division on the one hand, and the Washington District, Corps of Engineers, on the other in all matters pertaining to the Washington aqueduct.

(7) *Size of the aqueduct operations.*—The operating expenses of the Washington aqueduct have stayed very close to the round figure of $2 million per year during recent years. The aqueduct collects and treats 65 billion gallons of water per year. Its maximum day of supply, occurring in 1953, was 265 million gallons.

(8) *Character of water treatment problem at present.*—The Potomac River at Great Falls cannot properly be called a heavily polluted stream at this time—and may I emphasize at this time. With the exception of wastes entering the Monocacy River below Frederick, there is no sizable pollutional load entering the Potomac between Harpers Ferry and Great Falls intakes. Thus, natural purification processes have the opportunity to lighten the effect of the upstream pollution. Nevertheless, the quality of the raw water is not such as to permit laxity in the control of its treatment. Wide fluctuations in the number of coliform organisms and in pollution by suspended matter, such as silt, occur frequently with changes in the river stage. An average of 4,000 bacteriological tests of samples are made per year; approximately 4,500 tests for turbidity, and

3,800 tests for alkaline content. In addition, the Water Division of the District of Columbia routinely analyzes approximately 3,500 samples per year taken from the distribution system. Continuing vigilance is exercised by the laboratory, all steps in the treatment of water are supervised 24 hours a day, 7 days a week, and key personnel are subject to call at any off-duty hours.

I emphasized that I describe the condition of the river at this time. In recent months, there has been a marked increase in manifestation of pressure toward residential, commercial, and some Federal developments in the immediate watershed of the Potomac above the District of Columbia. This has come to our attention mainly through applications to the State water control agencies for permits for the construction of small sewage treatment plants. My office is also aware, of course, of plans for developments that are publicized in the press, and aware of the increase in population density moving toward this reach of the Potomac River. These factors, all put together, portend a future condition which causes us a great deal of concern when we realize that there is no plan on the books for any method of sewage disposal other than numerous small treatment plants discharging their effluent into the Potomac River above our Little Falls site and, we predict in the longer range, above Great Falls as well. Even though these effluents be treated so that they contain no direct public-health hazards, they are still rich in elements which are highly nutritional to aquatic plant growth. The plant growth in turn can easily create conditions of taste and odor of the water which are extremely hard to eliminate by water treatment. The Interstate Commission on the Potomac River Basin, the National Capital Planning Commission, and the National Capital Regional Planning Council have taken great interest in this subject and the latter two have set up a joint subcommittee with this subject as its sole term of reference. I have placed considerable emphasis on this subject because sufficient enrichment of the river's nutrition of aquatic plant growth can give us problems with higher temperatures.

(9) *Proposed Pepco plant in Loudoun County, Va.*—The staff of the Washington District brought news releases to my attention early in September announcing Pepco's intention to build a steam powered electric generating plant on the Potomac River near Sugarland Run in Loudoun County, Va. The staff had queried Pepco's existing plants and received information as to the flow of water used in cooling the turbine-exhaust condensers and the amount the temperature of the water was raised. This information, coupled with knowledge of difficulties experienced elsewhere with taste and odor problems in dealing with warm water, raised disturbing possibilities that the proposed plant would adversely affect the raw water supply. In a meeting on 9 September in which Pepco was represented by Mr. R. W. Wilson, vice president, and Mr. L. W. Cadwallader, chief engineer, it was agreed that technical data would be exchanged between the Washington District and the Potomac Electric Power Co. upon the basis of which firm conclusions could be reached regarding the effect of the plant on the quality of the river water as a use for municipal water supply. As quickly as possible my office assembled data from our records on the history of the river in terms of the amount of river flow and the temperatures of the river water. These data were forwarded to Mr. Cadwallader as soon as assembled.

(10) *Engagement of consultants.*—During the interim, while Pepco engineers were preparing and assembling data to be furnished my office, I engaged the firm of Chas. T. Main, Inc., to review the Pepco data and perform extensive additional analyses relative to the effect the plant would have on the temperatures of the river water. This firm was selected because of its long experience and proven ability in steam powerplant design and in problems dealing with river flows. During this interim, I also engaged Dr. Chas. E. Renn of Johns Hopkins University to make the necessary investigations and provide his opinions and conclusions with respect to the effect the temperature changes would have on the condition of the water in terms of both bacteria and aquatic plant growth. The scope of Dr. Renn's work includes the translation of these conclusions into predictions regarding the problems of producing finished water that is both safe and palatable. His scope of work includes investigation into any other possible sources of pollution from the plant in connection with the disposal of ashes, the handling of coal and the possible discharge of chemical wastes.

(11) *Investigations made.*—The chief engineer of Pepco delivered data to my office on October 11, in the form of a preliminary analysis of the heat balances in the entire thermal system of the proposed plant, which produced figures as to the volume of water that will flow from the river past the heat transfer coils of the condensers and back into the river and the amount the temperature of

this water will be raised above the prevailing river temperature. This data was immediately forwarded to Chas. T. Main, Inc., who have subsequently been engaged in its review and projection of the temperature change down stream from the plant under various conditions of river flow, dry bulb and wet bulb temperatures of the atmosphere, and relative humidities. Dr. Renn has been engaged in the collection of basic data from our plant records regarding the normal quality of the river water under various conditions, and in research into various recognized works by other authorities and the application of this fund of information together with his own expert knowledge to a determination of the ultimate effect of the plant on the water treatment problem. My office has assisted in keeping Dr. Renn advised of preliminary findings of Chas. T. Main in order that he could keep his work integrated with theirs.

(12) *Major aspects of the problem.*—I shall state briefly, and rather categorically, the findings of our consultants and leave the more complete statements to be made by them directly. In addition, I shall present statements about two other aspects of the construction of a large plant in the proposed location. These are: (1) The probability of further industrialization of the immediate area with possible adverse effects which cannot be evaluated at this time, and; (2) the possible conflict between the proposed plant location and future requirements, now foreseen, for reservoir storage to provide adequate water supply for the District of Columbia and its environs.

(1) *Syllabus of findings as to temperature.*—Chas. T. Main agrees with Pepco that, for the 300,000-kilowatt-capacity plant which will be initially constructed, 400 cubic feet per second of water will be taken from the river, passed through the condensers and returned to the river, and that the temperature of this 400 cubic feet per second of water will be raised 14° F. The firm has made extensive mathematical analyses of this effect on river temperatures between Pepco's proposed location and our present Great Falls intakes; also between that point and our future Little Falls intakes. To summarize the findings of the firm, subject to minor variations up or down—if the water, that flows through the condensers and the water, that flows past the plant in the riverbed, mix completely just below the plant, the river at low flow will have its temperature increased 7.2° F. The temperature will decrease as the water flows downstream and will be in the order of 2° F. above normal river temperature for the day at Great Falls and in the order of 1° F. above normal at Little Falls. If the two flows of water do not mix, the right-hand half of the river at low flow will be 14° F. above normal just below the plant and the left-hand half will be at normal temperature. At Great Falls the water would be in the order of 2° F. above normal and about 1° F. at Little Falls. We know that two flows of water of different temperatures resist mixing, but we recognize that we have a rather turbulent stretch of around 6 miles in the total reach under consideration. The temperature environment of bacteria and aquatic plant growth between the plant site and our water intakes would vary along the river from 14° F. down to 1° F. above the concurrent normal temperature of the river. At low river stage the temperature at the consumer's tap will probably be from 1° to 2° higher than it would otherwise have been. We have recorded tap temperatures as high as 87° F. on 3 days in July 1955.

(14) *Syllabus of findings as to bacterial, chemical, and aquatic plant problems.*—Dr. Renn finds that there will be no adverse bacterial effect resulting from the temperature increase; also that there will be no significant change in aquatic plantlife until there is marked increase in the organic content of water. An increase in the pollution load in the amount of two industrial plants of the size of plants in the Cumberland, Md., Piedmont, W. Va., area, engaged in manufacturing processes which generate organic wastes, would supply organic nutritional matter for aquatic plantlife of sufficient amount to create serious taste and odor problems with the water. The industries would have to be within about 10 miles upstream of the Pepco plant. For residences to produce the same effect would require a population of about 1 million people with sewage treatment or about 200,000 without treatment. The warming of the water by the Pepco plant would aggravate the condition. The location of industrial plants on the river would raise another serious problem in the discharge of wastes containing sulfates, which in our Dalecarlia and McMillan Reservoirs would reduce to sulfides, giving the water offensive odors and tastes that are very hard to remove. The warming of the water by the Pepco plant would not aggravate this condition. However, all industrial effects are pertinent to Pepco's proposed site, in view of the company's reported agreement with the land syndi-

cate to assist in gaining further industrial zoning. The prospect of further industrialization of the area is a very disturbing element.

(15) *Forecasted future water demands.*—Pepco's proposal to build on the site under consideration brings into focus a requirement of the Washington greater metropolitan area for watershed planning and development to preserve its capability of meeting its future water requirements. Otherwise, when water storage becomes immediately essential the metropolitan area may find the storage areas built up and priced out of reach. The maximum daily water demand of Washington Aqueduct occurred in September 1953 at 265 million gallons per day. The foundation of the master plan published in House Document 480 is the projection of future water demands based on estimated population growth and estimated increase in the per capita consumption of water. The 265 million gallons per day demand in 1953 was 25 million gallons per day in excess of the maximum demand we had projected for that year in House Document 480. The projection in that document for the year 1970 is 312 million gallons per day, in 1985 334 million gallons per day, and in the year 2000 342 million gallons per day. These projections are on the assumption that no national emergency occurs in the intervening years. We estimate that an emergency comparable to World War I would increase the demand in 1970 by 77 million gallons per day and would increase the demand in years 1985 or 2000 by 85 million gallons per day. We have been informed by the Washington Suburban Sanitary Commission that that agency is studying the Potomac River and Seneca Creek as an additional source for 60 million gallons per day. According to its chief engineer, the demand on the river by about 1970–75 will be in the order of either 17 million gallons per day or 32 million gallons per day, depending on the scheme of distribution adopted. We have assumed about 20 million gallons per day in 1970, increasing to 60 million gallons per day by 2000. Fairfax County, Va., is confronted with the requirement for a county system with a demand of 43 million gallons per day, which we believe will be furnished by the Potomac in one way or another. We assume that there will be a demand in the order of 15 million gallons per day by 1970. Rockville, Md., is looking toward the Potomac with interest for a supply of 3 million gallons per day, and Frederick, Md., for 7 million gallons per day. Supplemental irrigation has recently come into firm practice in both Virginia and Maryland and is increasing by geometric proportions. Based upon data which we have been able to obtain, we estimate that approximately 160 million gallons per day will be taken from the Potomac River above our intakes for this purpose by the year 1970. Forty-eight thousand acres of irrigated land in the basin, with two-thirds of it irrigated from the river and one-third from farm ponds and wells, will take this amount of water from the flow of the river.[1]

We must also consider pollution abatement in the reach of the river below Chain Bridge. If we have a repetition of the conditions of 1930 (in which year the flow of the river reached a low of 507 million gallons per day) with our present demands on the river, we will leave only about 240 million gallons per day to flow on down through the Chain Bridge, Key Bridge, Memorial Bridge reach of the river. This amount is entirely inadequate for purposes of pollution abatement and would allow accruals of suspended and floating matter to ebb and flow with the tide in this reach. A condition such as this appears intolerable. I believe that in our planning we must, out of regard for the river condition below our intake, leave at least 1,000 cubic feet per second (which is 650 million gallons per day) to flow down through this reach of the river in order to contribute at least the minimum toward flushing the stream. This amount would only prevent worsening the present condition. We cannot now provide this minimum in July and August in years when the flow of the river is below approximately 1,400 cubic feet per second during these months. The low flow in 1930 was 782 cubic feet per second. From the best projection that we

[1] From data contained in the publication, Maryland Guide for Sprinkler Irrigation Design, prepared by the Soil Conservation Service of the University of Maryland Agricultural Experiment Station, the Washington District, Corps of Engineers, United States Army, derived that 10.8 inches of water would be applied in a 60-day irrigation season. The district verified these results in discussion with engineers of the above-mentioned Soil Conservation Service. According to a pamphlet, Trends and Developments in Irrigation in Maryland, written by Prof. Luther B. Bohanan of Maryland University, about two-thirds of the land irrigated in the State uses water from rivers and creeks and one-third from ponds and wells.

With land irrigated according to the above data, 100 acres will use 1 acre-foot of water per day; 200 acres will use 1 cubic foot of water per second; 300 acres will use 1 million gallons of water per day.

can make at this time, it appears that the requirements in 1970, without an intervening national emergency, for Washington Aqueduct, Washington Suburban Sanitary Commission, Fairfax County, Frederick, Rockville, supplemental irrigation and pollution abatement will be around 1,167 million gallons per day.[2]

It is now becoming apparent that our assumption in preparing the plan published in House Document 480 was unduly optimistic when we forecasted that impoundment of water in storage reservoirs would not be required before the year 2000. It appears probable now that this requirement may have to be met in the course of the next 15 years. We have made very quick preliminary studies of the storage pool that would be required to meet the water demands of Washington Aqueduct if a dam were constructed at the River Bend site just below Pepco's proposed location. This was found to be the best site for a dam of all of the 14 sites that were studied by the Corps of Engineers in 1942, 1943, and 1944 in connection with comprehensive development of the Potomac River as a civil works project. The results of our studies to determine the water storage pool level can be considered only approximate because we geared our time allowance to the date set for this hearing. Our studies indicate that a storage pool at, roughly, elevation 213 would be required. However, when a dam is constructed, it must provide sufficient freeboard and headwater capacity above the storage pool level to store the backup of the largest flood that might possibly occur, and, of course, the spillway must be designed to pass such a flood. To meet these requirements, a dam at River Bend with a storage pool of 213 would have to provide for a design flood pool at, roughly, elevation 225. The elevation of the site proposed by Pepco is approximately 210 according to our information. Therefore, if the plant is built at this location, the use of the River Bend site for water supply will be denied to the metropolitan area, including Virginia and Maryland, because of the obvious impracticality of purchasing a $100 million installation and putting it out of service. From map reconnaissance made since this problem has arisen, there does not appear to be any feasible site for a dam between River Bend and Harpers Ferry. A dam at Harpers Ferry would provide only about one-third of the storage required. To meet the future needs if the Pepco plant is built at the Sugarland Run site, it appears that it would be necessary to construct one or more dams on the tributaries of the Potomac. Since there would be other water users between such dams and the Washington Aqueduct intakes, it seems that such reservoirs should include other purposes in addition to water supply of the District of Columbia and its environs, and that the cost should be apportioned between the District of Columbia water fund and other beneficiaries. I want to state at this point that, inasmuch as I have not initiated any official action in regard to water storage, my remarks on the subject at this time only express the opinion of the district engineer and do not express a position of either the Corps of Engineers or the District of Columbia Government.

(16) *Summary.*—According to the findings of our consultants—

(*a*) The location of two medium-sized industries discharging organic wastes within a 10-mile reach upstream of the Pepco site would support aquatic growth giving rise to serious problems of water taste and odor. The heat added to the water by the Pepco plant would aggravate this condition.

(*b*) The location of industries above our intakes discharging sulfates into the river would raise most difficult taste and odor problems which, however would not be aggravated by the addition of heat at the Pepco site.

For the above reasons, the prospect of further industrialization is a seriously objectionable feature of the proposed site.

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[2] Water demands forecasted by the year 1970, of the users listed, in million gallons per day:

Washington Aqueduct	312
Washington Suburban Sanitary Commission	20
Fairfax County, Va	15
Frederick, Md	7
Rockville, Md	3
Supplemental irrigation	160
Pollution abatement	650
Total	1,167

(1,167 million gallons per day is equal to 1,805 cubic feet per second.)

The construction of a large, expensive installation in a low-lying plain of the immediate watershed, such as the proposed site, will give the District of Columbia and its environs a very perplexing problem in meeting its water requirements when storage becomes necessary.

(17) *Presentation of consultants.*—Mr. Samuel T. Favor, mechanical engineer, and associate in the firm of Chas. T. Main, Inc., is prepared to present the statement of the firm regarding the effects of the plant on river temperature. Dr. Charles E. Renn of Johns Hopkins University is prepared to present his statement relative to the bacterial, chemical, and plant growth aspects of the problem. I have presented only the meager highlights of their findings. I respectfully request that the committee now hear the statements of these two gentlemen, with Mr. Favor preceding.

Colonel ADAMS. Covered in that is the responsibility assignment to the Chief of Engineer, the district engineer, and the authority for supplying water to Arlington and Falls Church, Va.; also, a rather complete presentation of the master plan and authority for capital expansion of the Washington aqueduct.

In regard to the master plan, I would like to state that the master plan of capital expansion of the system and the authorization for the construction of planned facilities are contained in House Document No. 480, 79th Congress, 2d session.

Under construction at this time, pursuant to that master plan, are 3 projects, 1 of which is the Little Falls station, and inasmuch as it figures to a certain extent in later presentation, I will have a word about that at this time from my written statement.

This station is located approximately 1 mile above Chain Bridge on the Potomac River and will, when completed, consist of a 14-foot diversion dam, a pumping system of an initial firm capacity of 350 million gallons per day, and ultimately a firm capacity of 500 million gallons per day.

The intake work and a water transporting tunnel from that site over to the reservoir at Dalecarlia treating plant. This will be the future raw-water supply of the aqueduct system.

At present the water is taken from Little Falls and water is taken from Great Falls, which is approximately 10 miles upstream from the District line.

This water flows by gravity from Great Falls to Dalecarlia in two large conduits which lie under MacArthur Boulevard for a larger portion of the way. One of these conduits is about 100 years old, and the other was built in 1927. The capacity of the two conduits is not equal to the heaviest daily water consumption in the summer months, and for several years, supplementary water has been pumped from the C. and O. Canal, near Dalecarlia, in meeting the heaviest demands.

The required annual maintenance of the conduits has been increasing significantly in recent years. We have no reserve to fall back on in the event a major failure should occur during the summer months, and we can foresee the time when maintenance costs will become excessive. So with the completion of the Little Falls station, which was placed under construction in May 1955, we will have a reserve capacity and the capability of phasing out the gravity service when its maintenance becomes such that it will be cheaper to pump from Little Falls.

Briefly, the relation between the Washington aqueduct and the District of Columbia is that the Washington aqueduct, operated by the

Corps of Engineers, collects, purifies, and treats water for the District of Columbia and its environs, and pumps water where it is delivered to the District of Columbia, to the District's Bryant Street plant, and three high-level reservoirs in the western part of the city.

From there on the District of Columbia government pumps and distributes the water. The Washington aqueduct pumps water directly to the Pentagon, Fort Myer command, and the Navy Department buildings in Arlington, Va.

The aqueduct also pumps directly to Arlington County, and to Falls Church, Va., and those political subdivisions do the distribution pumping.

The Washington District Corps of Engineers budgets annually for operating and maintenance expenses and authorized capital expansion of the Washington aqueduct. And this budget is coordinated with the District of Columbia government, and, when agreed to, is incorporated into the District of Columbia budget for presentation to the Bureau of the Budget.

So obligations and expenditures of the Washington district for the Washington aqueduct are pursuant to congressional appropriations and funded from the water revenues of the District of Columbia.

As a quick guide to the size of the aqueduct operations: The operating expenses of the Washington aqueduct have stayed very close to the round figure of $2 million per year during recent years.

The aqueduct collects and treats 65 billion gallons of water per year. And its maximum day of supply, occurring in 1953, was 265 million gallons.

Senator MORSE. May I interrupt at this point to ask your opinion as to approximately how soon you think it will be necessary to replace the 100-year-old conduit that you now are using for the transmission of water into the District?

Colonel ADAMS. Actually, the conduit we believe that will require replacement first, strangely enough, is the one completed in 1927. That is due to two conditions: One, the 100-year-old conduit was built at a time when it was economically feasible to build with very heavy stone masonry and it is of very heavy stone masonry construction. The second reason is that it occupies the best line.

The 1927 conduit had to take second best, where it is subject to a certain amount of subsidence, due to side-hill fills.

That is pretty much of a guess, but in my opinion within some time, the next 10 to 15 years it will be necessary to abate the 1927 conduit, because of the excessive maintenance costs.

Senator MORSE. The reason that I raise the question at this point is because of your figure in the sentence:

> The operating expenses of the Washington aqueduct have stayed very close to the round figure of $2 million per year during recent years.

I thought we ought to have in the record an estimate, if you could make it, as to an increase in this amount that you expected in the near future because of any replacement of aqueducts in our conduits, et cetera, and I took it for granted that the 100-year-old conduit would probably be the first to go.

I think it is a very interesting observation that that is not the case, but that the 1927 conduit will be the first one to go.

If and when you have to replace the 1927 conduit, what would be the estimated cost?

Colonel ADAMS. Well, we will not replace the 1927 conduit, because when it becomes necessary to abate that conduit we will then take that amount of water, or the amount that is required by pumping from the Little Falls plant, which is now under construction. Under conditions as they are today it is more economical to build a plant on the river and pump, than it is to replace that long gravity conduit. We foresee no significant increase in operating expenses as a result of that.

In regard to the character of water-treatment problem at present, the Potomac River at Great Falls cannot properly be called a heavily polluted stream at this time. And may I emphasize "at this time."

Senator MORSE. And "at Great Falls"—you would emphasize both, would you not—"at this time" and "at Great Falls"?

Colonel ADAMS. I believe so. There is more opportunity for pollution to increase in the future below that. With the exception of wastes entering the Monocacy River below Frederick, there is no sizable pollutional load entering the Potomac between Harpers Ferry and Great Falls intakes. Thus, natural purification processes have the opportunity to lighten the effect of the upstream pollution. Nevertheless, the quality of the raw water is not such as to permit laxity in the control of its treatment. Wide fluctuations in the number of coliform organisms and in pollution by suspended matter, such as silt, occur frequently with changes in the river stage. An average of 4,000 bacteriological tests of samples are made per year; approximately 4,500 tests for turbidity, and 3,800 tests for alkaline content.

Senator MORSE. If you do not mind, just for clarification, will you make a definitive statement as to turbidity at this point in the record?

Colonel ADAMS. Well, "turbidity" is the quality of having solids suspended in the water. It is mainly silt. So a measure of turbidity is a measure of the amount of fine suspended material that is contained in the water. The more turbid it is, the more cloudy it would look if you would hold it up in a test tube, for example.

In addition, the Water Division of the District of Columbia routinely analyzes approximately 3,350 samples per year taken from the distribution system. Continuing vigilance is exercised by the laboratory, all steps in the treatment of water are supervised 24 hours a day, 7 days a week, and key personnel are subject to call at any off-duty hours.

I emphasized that I described the condition of the river at this time. In recent months there has been a marked increase in manifestation of pressure toward residential, commercial, and some Federal developments in the immediate watershed of the Potomac above the District of Columbia.

This has come to our attention mainly through applications to the State water-control agencies for permission for the construction of small sewage treatment plants.

My office is also aware, of course, of plans that are publicized in the press, and aware of the increase in the population density moving toward this reach of the Potomac River.

In regard to Federal establishments, those agencies have coordinated and consulted with the district engineer. I refer specifically to CIA and AEC, both of which are coordinating with us fully.

These factors, all put together, portend a future condition which causes a great deal of concern when we realize that there is no plan on the books for any method of sewage disposal other than numerous small-treatment plants discharging their effluent into the Potomac River above our Little Falls site and, we predict in these longer ranges above Great Falls, as well. Even though these effluents be treated so that they contain no direct public health hazards, they are still rich in elements which are highly nutritional to aquatic plant growth. The plant growth in turn can easily create conditions of taste and odor in the water which are extremely hard to eliminate by water treatment.

The Interstate Commission on the Potomac River Basin, the National Capital Planning Commission, and the National Capital Regional Planning Council have taken great interest in this subject and the latter two have set up a joint subcommittee with this subject as its sole term of reference.

I have placed considerable emphasis on this subject because sufficient enrichment of the river's nutrition of aquatic plant growth can give us problems with higher temperatures.

Senator MORSE. Let's pause there for a moment. Congressman Smith and Senator Beall, feel free to interrupt at any time. I want to go back to your comments on page 8, the bottom of your statement, where you say:

> Even though these effluents be treated so that they contain no direct public health hazards, they are still rich in elements which are highly nutritional to aquatic plant growth.

As you know, the Senate District Committee has been very much interested in this whole problem of the Potomac River pollution. In fact, we now have that matter under consideration. It is my understanding, as a member of that committee, that it does not necessarily follow that because there is established a sewage disposal treatment plant—it necessarily does not follow, I repeat, that that plant will so treat the sewage that it does not create a health hazard.

Colonel ADAMS. I believe that is true, that it does not necessarily follow that sewage treatment will completely eliminate public health hazards.

There are many possibilities that have to be guarded against, particularly with a small-treatment plant. The history of such plants shows that too often the capacity for which the plant was designed was not based upon a long enough look into the future, and very soon the plants become overloaded. And an overloaded plant is hazardous.

Frequently, the superintendence of small plants is not as vigilant as it should be. And any of those factors can allow effluent to reach the river which contains harmful organisms.

Senator MORSE. That is the point that I want to dwell on for just a moment, because I think a year and a half ago, or 2 years ago, a subcommittee of our committee was taken on an inspection tour of the Potomac River. We were briefed rather extensively and intensively on the sewage dumping, and the program that is now being carried on in the river.

We were advised that although you have sewage disposal treatment plants, they are of the so-called smaller type. When you have a con-

siderable number of them dumping their treated sewage into the river, where there is only a certain percentage of what they call effective treatment performed in these plants, that that accumulation from a series of small plants may very well result in a health hazard. Is that a correct briefing?

Colonel ADAMS. I would suggest that Dr. Renn, a bacteriologist, and professor of sanitary engineering, could testify on this particular point more expertly than I, if you would like to have his comment.

Senator MORSE. Would you like to do it now, or would you like to have us wait and to keep it in mind, and in his own right to testify later, so that I would not be interrupting you.

Senator Beall suggests that it be done now.

Dr. RENN. I think that the evaluation that has been given is essentially correct. The major hazard from effluent from small treatment plants, going into a relatively large river, would come from a lack of suitable control of the system.

It is perfectly true that a small portion, a somewhat lower proportion than the total than the organic removal of that bacteria will come through. The essential act of the treatment plant is to reduce the effective size of the population.

Senator MORSE. By way of a hypothetical—you have to educate me—let us put it this way. Here we have river X that runs a certain volume of water. On river X you have small sewage disposal treatment plants A and B. They treat their sewage to a percentage—help me with the technicalities, shall I say of 60 or 70 percent effectiveness. Then the population increases along the riverbank and additional small sewage treatment plants C and D are added.

When you put the disposal of the 4 plants into the river, do you run a risk, if the volume of the waterflow is not sufficient, of increasing the health hazard because of the fact that the percentage of the effective treatment of the 4 plants now remaining, we will say, at 60 to 70 percent is leaving from 30 to 40 percent of the sewage going into that river that is not, in effect, adequately treated. Is that a fair hypothetical?

Dr. RENN. Yes; but it should include two features that will happen along with it.

First of all, before we have our four plants, it is very likely that plant A will be overloaded and that plant B will be instituted either through a separate growth, or through pressure. So that plant A is not delivering any waste that has ben 80 percent treated, but may be delivering 60 percent.

The second qualification which is an inherent part of your hypothetical case is that when plants 1, 2, 3, and 4 have been stabilized, the natural purification capacity of the stream itself is not fully being utilized, because the plant will have different outfalls down the stream, but the intervals between one point of pollution and the second point has shortened. So we are not able to utilize the natural purification of the stream which we always consider in the design.

Senator MORSE. That is, for the most effective natural purification, we have to have a planning of the location of the sewage treatment plants, so that they are not located so close together, that the natural purifying qualities of the water then cannot effectively work on the sewage. Is that your point?

Dr. RENN. That is right.

Senator MORSE. Therefore, I would be correct in saying that it is important, applying it now to the Potomac River, thinking ahead for decades before us, that we do some planning that will result at least in the location of our sewage treatment disposal plant at such a point that the volume of water in the Potomac will be adeqaute to naturally treat the sewage that the operation of the plants of itself does not take care of by way of destroying harmful bacteria.

Dr. RENN. That is certainly essential.

Senator MORSE. Let me dwell on it just a little for clarity of the record.

Would you say then, Dr. Renn, that those of us who have the responsibility of doing what can be done legislatively to protect the health of the people in the Capital have an obligation to aim, at least in working out a sewage-disposal system, by whatever legislative medium we can, that will protect the health of the people living in this metropolitan area who are served by the Potomac River, so far as their sewage disposal is concerned?

Dr. RENN. Yes. It affects your own water supply. The possibility exists there.

Senator MORSE. As you know, there are a variety of proposals which are being tried to work out with Virginia and Maryland and the District of Columbia, either by compact, or by some other arrangement, a cooperative program for the protection of the public health in all three areas, insofar as the dumping of sewage into the Potomac River is concerned, and insofar as the establishment of sewage-treatment plants is concerned.

There is no secret about the position that I have taken on that. I would change it overnight if somebody showed me that the facts warranted a change, but my position in the Senate has been that the two States and the District of Columbia ought to try to get together on a joint program for the handling of the sewage that goes into the Potomac River, as well as the industrial waste.

Mr. SMITH. You have in mind the Commission that is now functioning on that, known as the Potomac River Basin Commission. They are doing a good deal of the research and the work on it.

Senator MORSE. Yes, they are.

Mr. SMITH. I doubt if they have very much authority.

Senator MORSE. That is the trouble. I offered a bill 2 years ago, I think, and we have had to revise it because we ran into that very legal problem as to the lack of legal authority.

I am tentatively of the opinion that possibly our best approach would be by way of compacts.

Mr. SMITH. I think that you have a bill pending in the Senate now.

Senator MORSE. I have a revised bill pending in the Senate.

Go ahead, Colonel Adams.

Colonel ADAMS. On this subject of a plant for sewage disposal, last August in the Washington district, we called a meeting of representatives of the Interstate Commission on the Potomac River, the National Capital Planning Commission, and the National Capital Regional Planning Council, to get the problem as we saw it from a water-supply viewpoint clearly before them.

And, as a result of that meeting, the National Regional Planning Council, the National Capital Planning Commission, have set up this joint committee with this subject as the sole term of reference. And the Interstate Commission is actively studying the problem. So I thought the committee would be interested in those steps that have been taken.

Senator MORSE. We are interested in it. I think I can speak for the Senate committee because I know of no dissenting voice on it. Every member of our committee is of the opinion that we must do whatever the facts warrant in protecting the health of this area from pollution in the Potomac.

A year and a half ago we were taken to a rather large area on the Potomac by the Sanitary Engineer, and he pointed out that below us—we were in a boat—was 12 feet of sludge, which came as somewhat of a disturbing fact to the members of the committee.

It was stated at that time that it is not known of any other river in the world, where you can find as large an area in the bed of that river, 12 feet of sludge. If those facts are true, and if what Dr. Renn has testified is true, which I am sure it is, as to the need of some planning—of so placing our plants that the natural purifying qualities of the water can go to work on sewage that is dumped into the river, with our population in the area increasing by leaps and bounds each year, we cannot, in my personal judgment, longer ignore the problem of pollution in the Potomac from the standpoint of health.

Go ahead.

Colonel ADAMS. At this point, I believe it would be useful to the committee members if they had placed before them a strip map which shows the location of Little Falls, Great Falls, and the proposed Potomac Electric Co. site.

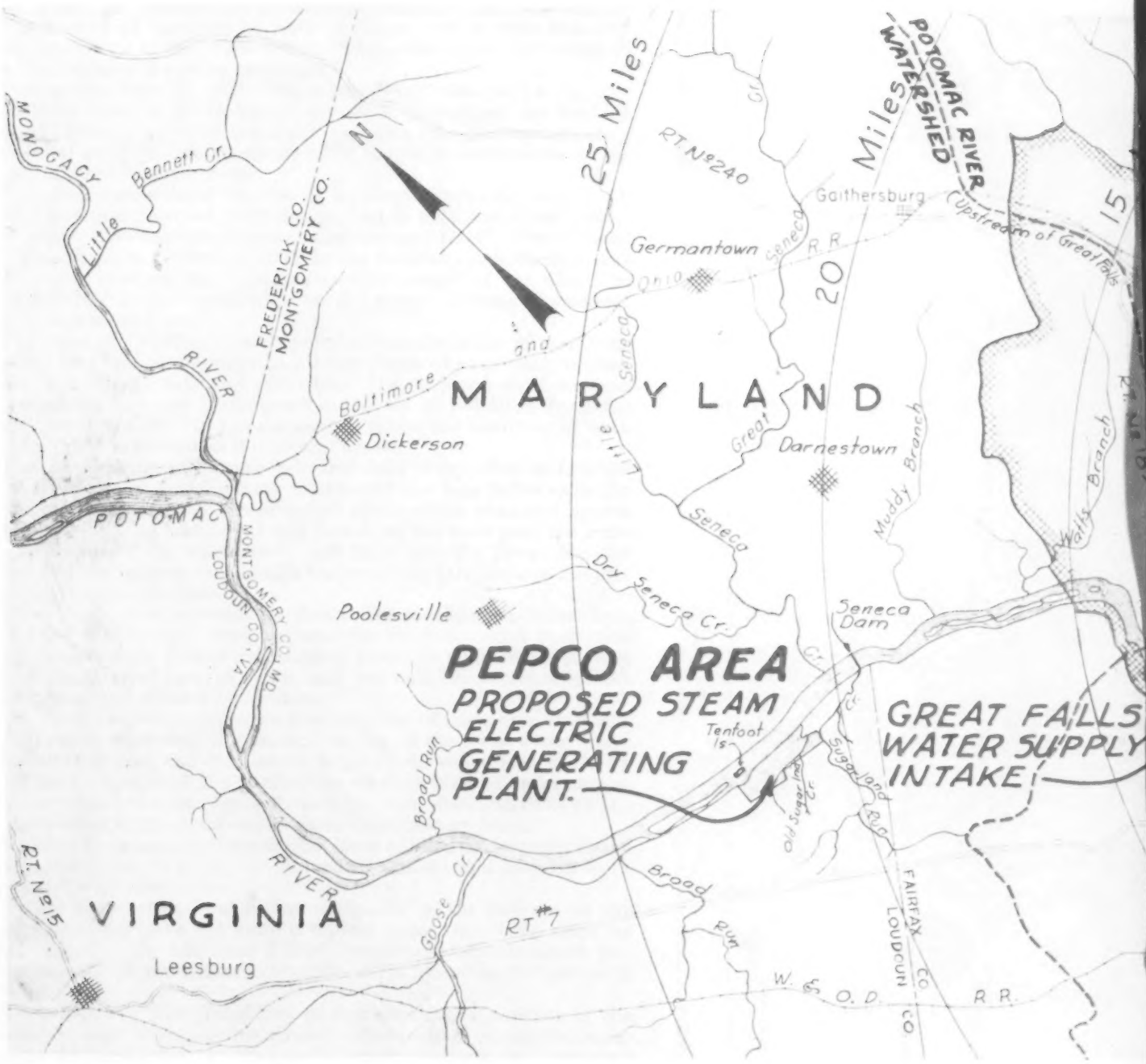
Senator MORSE. That will be marked for purposes of identification as "Exhibit No. 1" of this hearing, a strip map entitled "Washington and Environs, Corps of Engineers, United States Army, Office of the District Engineer, Washington District, Washington 25, D. C." The map shows the proposed Pepco area, proposed steam electric generating plant, and other subtitles.

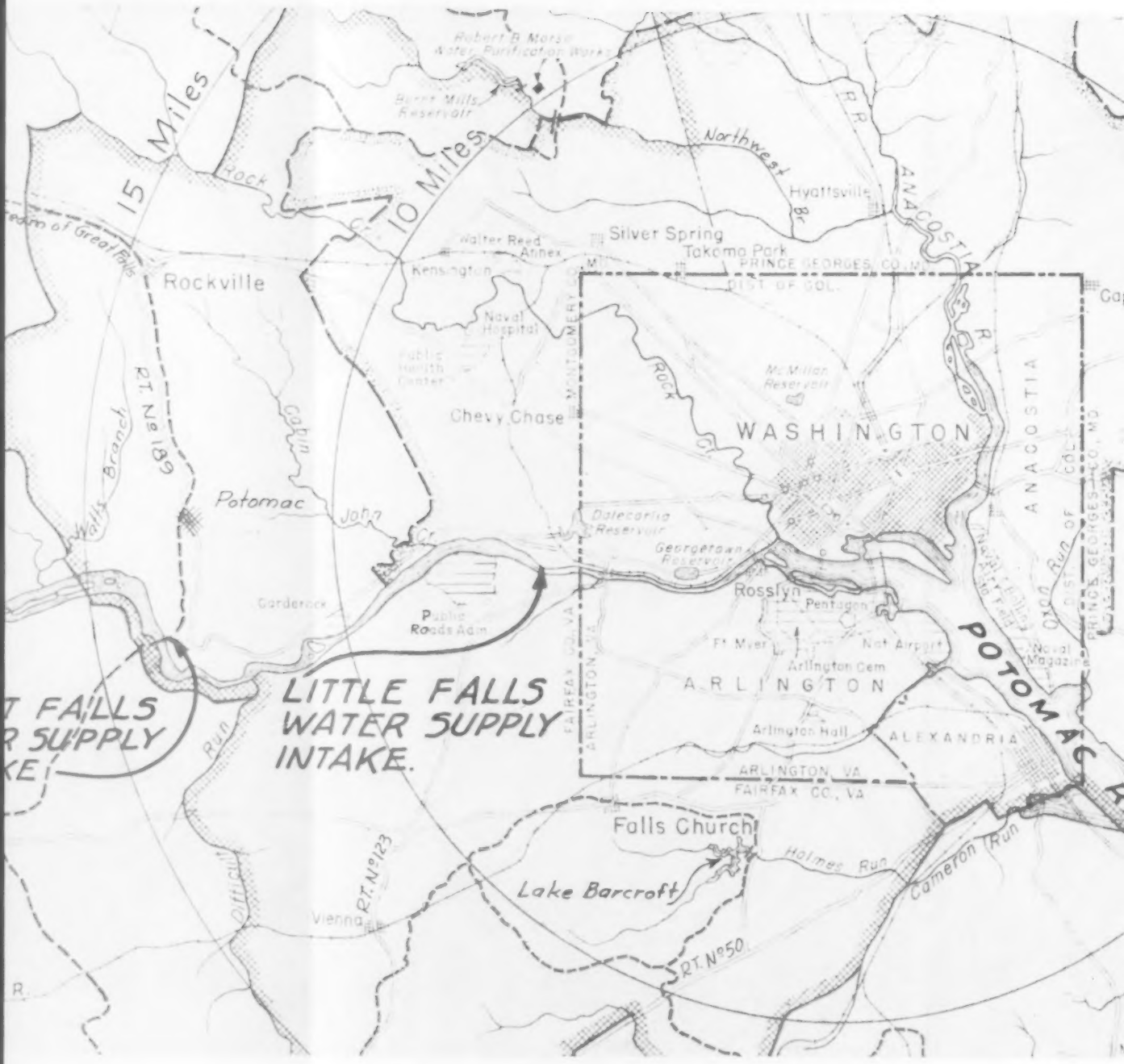
(The strip map referred to is herewith inserted:)

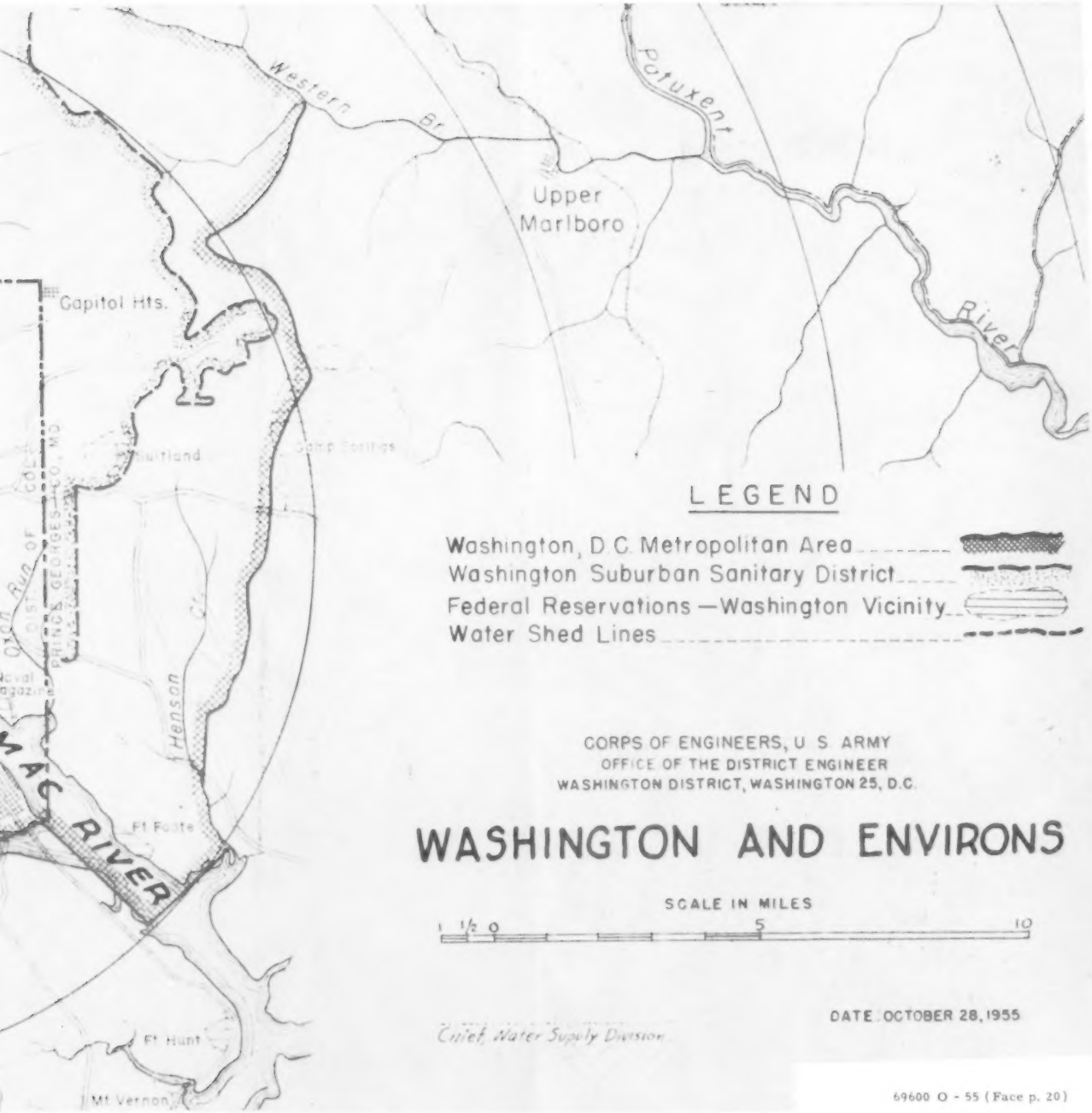
Colonel ADAMS. The staff of the Washington district brought news releases to my attention early in September announcing Pepco's intention to build a steam-powered generating plant on the Potomac River near Sugarland Run in Loudoun County, Va. The staff had queried Pepco's existing plants and received information as to the flow of water used in cooling the turbine exhaust condensers and the amount the temperature of the water was raised.

This information, coupled with knowledge of difficulties experienced elsewhere with taste and odor problems in dealing with warm water, raised disturbing possibilities that the proposed plant would adversely affect the raw-water supply.

In a meeting on September 9, at which Pepco was represented by Mr. R. W. Wilson, vice president, and Mr. L. W. Cadwallader, chief engineer, it was agreed that technical data would be exchanged between the Washington district and the Potomac Electric Power Co., upon the basis of which firm conclusions could be reached regarding the effect of the plant on the quality of the river water as a use for municipal water supply.


PEPCO AREA
PROPOSED STEAM ELECTRIC GENERATING PLANT.
GREAT FALLS WATER SUPPLY INTAKE
MARYLAND
VIRGINIA
POTOMAC RIVER WATERSHED
(Upstream of Great Falls)
25 Miles
20 Miles
15
N
MONOCACY
Little Bennett Cr.
FREDERICK CO.
MONTGOMERY CO.
RIVER
POTOMAC
Baltimore and Ohio R.R.
Dickerson
Germantown
Gaithersburg
RT. N°240
Little Seneca Cr.
Great Seneca Cr.
Darnestown
Muddy Branch
Wells Branch
Seneca Cr.
Dry Seneca Cr.
Poolesville
Seneca Dam
LOUDOUN CO. VA
MONTGOMERY CO. MD
Broad Run
Tenfoot Is.
Old Sugarland Run
Sugarland Run
RT. N°15
Leesburg
Goose Cr.
RT #7
Broad Run
FAIRFAX CO.
LOUDOUN CO.
W. & O.D. R.R.


15 Miles
10 Miles
Rockville
Chevy Chase
Silver Spring
Takoma Park
Hyattsville
Northwest Br
Walter Reed Annex
Kensington
Naval Hospital
Public Health Center
Burnt Mills Reservoir
Robert B. Morse Water Purification Works
McMillan Reservoir
Dalecarlia Reservoir
Georgetown Reservoir
WASHINGTON
ANACOSTIA
Rock Creek
Potomac
John
Glen
Walls Brand
RT. No 189
Garderock
Public Roads Adm
Rosslyn
Pentagon
Ft Myer
Nat Airport
Arlington Cem
ARLINGTON
Arlington Hall
ALEXANDRIA
ARLINGTON VA
FAIRFAX CO., VA
POTOMAC
Naval Magazine
Oxon Run
LITTLE FALLS WATER SUPPLY INTAKE.
T FALLS
R SUPPLY
KE
Run
Falls Church
Holmes Run
Cameron Run
Lake Barcroft
Vienna
RT. No 123
RT. No 50
Dam of Great Falls
R.



LEGEND

Washington, D.C. Metropolitan Area

Washington Suburban Sanitary District

Federal Reservations—Washington Vicinity

Water Shed Lines

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
WASHINGTON DISTRICT, WASHINGTON 25, D.C.

WASHINGTON AND ENVIRONS

SCALE IN MILES

1 1/2 0 5 10

Chief, Water Supply Division

DATE: OCTOBER 28, 1955

69600 O - 55 (Face p. 20)

As quickly as possible my office assembled data from our records on the history of the river in terms of the amount of river flow and the temperature of the river water. These data were forwarded to Mr. Cadwallader as soon as assembled.

During the interim, while Pepco engineers were preparing and assembling data to be furnished my office, I engaged the firm of Chas. T. Main, Inc., to review the Pepco data and perform extensive additional analyses relative to the effect the plant would have on the temperature of the river water.

This firm was selected because of its long experience and proven ability in steam-powered plant design, and in problems dealing with river flows. During this interim I also engaged Dr. Charles E. Renn of Johns Hopkins University to make the necessary investigation and provide his opinions and conclusions with respect to the effect the temperature changes would have on the water in terms of bacteria and aquatic plant growth.

The scope of Dr. Renn's work includes the translation of these conclusions into predictions regarding the problems of producing finished water that is both safe and palatable. His scope of work includes investigation into any other possible sources of pollution from the plant in connection with the disposal of ashes, the handling of coal, and the possible discharge of chemical wastes.

The chief engineer of Pepco delivered data to my office on October 11 in the form of a preliminary analysis of the heat balances in the entire thermal system of the proposed plant, which produced figures as to the volume of water that will flow from the river past the heat-transfer coils of the condensers, and back into the river, and the amount of the temperature of this water will be raised above the prevailing river temperature.

These data were immediately forwarded to Chas. T. Main, Inc., who have subsequently been engaged in its review and projection of the temperature change downstream from the plant under various conditions of river flow, dry bulb and wet bulb temperatures of the atmosphere, and relative humidities.

Dr. Renn has been engaged in the collection of basic data from our plant records regarding the normal quality of the river water under various conditions, and in research into various recognized works by other authorities, and the application of this fund of information, together with his own expert knowledge, to a determination of the ultimate effect of the plant on the water-treatment problem.

My office has assisted in keeping Dr. Renn advised of the preliminary findings of Chas. T. Main, Inc., in order that he could keep his work integrated with theirs.

I shall state briefly, and rather categorically, the findings of our consultants and leave the more complete statements to be made by them directly. In addition, I shall present statements about two other aspects of the construction of a large plant in the proposed location.

These are: (1) The probability of further industrialization of the immediate area, with possible adverse effects which cannot be evaluated at this time; and (2) the possible conflict between the proposed plant location and further requirements now foreseen, for reservoir storage to provide adequate water supply for the District of Columbia and its environs.

Chas. T. Main agrees with Pepco that, for the 300,000-kilowatt capacity plant which will be initially constructed, 400 cubic feet per second of water will be taken from the river, passed through the condensers, and returned to the river, and that the temperature of this 400 cubic feet per second of water will be raised 14° F.

The firm has made extensive mathematical analyses of this effect on river temperatures between Pepco's proposed location and our present Great Falls intakes; also between that point and our future Little Falls intakes.

To summarize the findings of the firm, subject to minor variations upward or downward—the water that flows through the condensers, and the water that flows past the plant in the riverbed mix completely just below the plant, the river at low flow will have its temperaure increased 7.2° F. The temperature will decrease as the water flows downstream, and will be in the order of 2° F. above normal river temperature for the day at Great Falls, and in the order of 1° F. above normal at Little Falls.

If the two flows of water do not mix, the right-hand half of the river at low flow will be 14° F. above normal just below the plant, and the left-hand half will be at normal temperature. At Great Falls the water should be in the order of 2° F. above the normal, and about 1° F. at Little Falls.

We know that two flows of water of different temperature resist mixing, but we recognize that we have a rather turbulent stretch of around 6 miles in the total reach under consideration. The temperature environment of bacteria and aquatic plant growth between the plant site and our water intakes would vary along the river from 14° F. down to 1° F. above the concurrent normal temperature of the river.

At low river stage, the temperature at the consumer's tap will probably be from 1° to 2° higher than it would otherwise have been. We have recorded tap temperatures as high as 87° F. on 3 days in July 1955.

Dr. Renn finds that there will be no adverse bacterial effect resulting from the temperature increase; also that there will be no significant change in aquatic plantlife until there is marked increase in the organic content of water. An increase in the pollution load in the amount of two industrial plants of the size of plants in the Cumberland, Md., Piedmont, W. Va., area, engaged in manufacturing processes which generate organic waste, would supply organic nutritional matter for aquatic plantlife of sufficient amount to create serious taste and odor problems with the water.

The industries would have to be within about 10 miles upstream of the Pepco plant. I would like to have that 10 to 15 miles upstream of the Pepco plant instead of as stated—on the basis of the very latest information.

For residences to produce the same effect would require a population of about 1 million people with sewage treatment, or about 200,000 without treatment. The warming of the water by the Pepco plant would aggravate the condition. The location of industrial plants on the river would raise another serious problem in the discharge of waste containing sulfates, which in our Dalecarlia and McMillan

Reservoirs would reduce to sulfides, giving the water offensive odors and tastes that are very hard to remove.

The warming of the water by the Pepco plant would not aggravate this condition. I am speaking now of the sulfite condition. However, all industrial effects are pertinent to Pepco's proposed site in view of the company's reported agreement with the land syndicate to assist in gaining further industrial zoning.

The prospect of further industrialization of the area is a very disturbing element.

Pepco's proposal to build on the site under consideration brings into focus a requirement of the Greater Washington Metropolitan Area for Watershed Planning and Development to preserve its capability of meeting its future water requirements.

Otherwise, when water storage becomes immediately essential, the metropolitan area may find the storage areas all built up and priced out of reach. The maximum daily water demand of Washington aqueduct occurred in July 1953, at 265 million gallons per day.

The foundation of the master plan published in House Document 480 is the projection of future water demands based on estimated population growth, and estimated increase in the per capita consumption of water.

The 265 million gallons per day demand in 1953 was 25 millions per day in excess of the maximum demand we had projected for that year in House Document 480. The projection in that document for the year 1970 is 312 million gallons per day. In 1985, it is 334 million per day, and in the year 2000, 342 million gallons per day. These projections are on the assumption that no national emergency occurs in the intervening years.

We estimate that an emergency comparable to World War II would increase the demand in 1970 by 77 million gallons per day, and would increase the demand in 1985 or 2000 by 85 million gallons per day. We have been informed by the Washington Suburban Sanitary Commission that that agency is studying the Potomac River at Seneca Creek, as an additional source for 60 million gallons of water per day.

According to its chief engineer, the demand on the river by about 1970–75 will be in the order of either 17 million gallons per day, or 32 million gallons per day, depending on the scheme of distribution adopted.

We have assumed about 20 million gallons per day in 1970 increasing to 60 million gallons per day by 2000.

Fairfax County, Va., is confronted with the requirement for a county system with a demand of 43 million gallons per day, which we believe will be furnished by the Potomac in one way or another.

We assume that there will be a demand in the order of 15 million per day by 1970.

Rockville, Md., is looking toward the Potomac with interest for a supply of 3 million gallons per day, and Frederick, Md., for 7 million gallons per day.

Supplemental irrigation has recently come into firm practice in both Virginia and Maryland and is increasing by a geometric proportion. Based upon data which we have been able to obtain, we estimate that approximately 160 million gallons per day will be taken from the Potomac River above our intakes for this purpose by the year 1970; 48,000 acres of irrigated land in the basin, with two-thirds

of it irrigated from the river and one-third from farm ponds and wells, will take this amount of water from the flow of the river.

I have footnoted the basis of this.

From data contained in the publication, Maryland Guide for Sprinkler Irrigation Design prepared by the soil conservation service of the University of Maryland Agricultural Experiment Station, the Washington District, Corps of Engineers, United States Army, derived that 10.8 inches of water would be applied in a 60-day irrigation season. The District verifies these results in a discussion with engineers of the above-mentioned soil-conservation service.

According to a pamphlet Trends and Development in Irrigation in Maryland, written by Prof. Luther B. Bohanan, of Maryland University, about two-thirds of the land irrigated in the State uses water from rivers and creeks and one-third from ponds and wells.

With land irrigated according to the above data: 100 acres will use 1 acre-foot of water per day; 200 acres will use 1 cubic foot of water per second; 300 acres will use 1 million gallons of water per day.

We must also consider pollution abatement in the reach of the river below Chain Bridge. If we have a repetition of the condition of 1930 (in which year the flow reached a low of 507 million gallons per day) with our present demands on the river, we will leave only about 240 million gallons per day to flow on down through the Chain Bridge, Key Bridge, Memorial Bridge reach of the river. This amount is entirely inadequate for purposes of pollution abatement, and would allow accruals of suspended and floating matter to ebb and flow with the tide in this reach.

A condition such as this appears intolerable. I believe that in our planning we must, out of regard for the river condition below our intake, leave at least 1,000 cubic feet per second (which is 650 million gallons per day) to flow down through this reach of the river in order to contribute at least the minimum toward flushing the stream.

This amount would only prevent a worsening of the present condition. We cannot now provide this minimum in July and August in years when the flow of the river is below approximately 1,400 cubic feet per second during these months. The low flow in 1930 was 782 cubic feet per second. From the best projection that we can make at this time, it appears that the requirements in 1970, without an intervening national emergency, for Washington Aqueduct, Washington Suburban Sanitary Commission, Fairfax County, Rockville, supplemental irrigation and pollution abatement, will be around 1,167 million gallons per day.

It is now becoming apparent that our assumption in preparing the plan published in House Document 480 was unduly optimistic when we forcasted that impoundment of water in storage reservoirs would not be required before the year 2000. It appears probable now that this requirement may have to be met in the course of the next 15 years.

We have made very quick preliminary studies of the storage pool that would be required to meet the water demands of Washington aqueduct if a dam were constructed at the River Bend site, just below Pepco's proposed location. This was found to be the best site for a dam of all of the 14 sites that were studied by the Corps of Engineers in 1942, 1943, 1944, in connection with comprehensive development of the Potomac River as a civil works project. The

results of our studies to determine the water storage pool level can be considered only approximate because we geared our time allowance to the date set for this hearing.

Our studies indicate that a storage pool at roughly elevation 213 would be required. That is for the single purpose of meeting the water demands of the Washington aqueduct serving the District of Columbia and its environs.

However, when a dam is constructed, it must provide sufficient free board and headwater capacity above the storage pool level to store the backup of the largest flood that might possibly occur, and, of course, the spillway must be designed to pass such a flood.

To meet these requirements, a dam at River Bend, with a storage pool of 213 would have to provide for a designed flood pool at roughly elevation 225.

The elevation of the site proposed by Pepco is approximately 210, according to our information.

Therefore, if the plant is built at this location, the use of the River Bend site for water supply will be denied to the metropolitan area, including Virginia and Maryland, because of the obvious impracticability of purchasing a $100 million installation and putting it out of service.

From map reconnaissance made since this problem has arisen, there does not seem to be any feasible site for a dam between River Bend and Harpers Ferry. A dam at Harpers Ferry would provide only about one-third of the storage required. To meet the future needs, if the Pepco plant is built at the Sugarland Run site, it appears that it would be necessary to construct one or more dams on the tributaries of the Potomac.

Since there would be other water users between such dams and the Washington aqueduct intakes, it seems that such reservoirs should include other purposes in addition to water supply of the District of Columbia and its environs, and that the cost should be apportioned between the District of Columbia water fund and other beneficiaries.

I want to state at this point that inasmuch as I have not initiated any official action in regard to water storage, my remarks on the subject at this time only express the opinion of the district engineer, and do not express a position of either the Corps of Engineers or the District of Columbia government.

In summary: According to the findings of our consultants:

(*a*) The location of two medium-sized industries discharging organic waste within a 10 mile reach upstream of the Pepco site would support aquatic growth giving rise to serious problems of water taste and odor. The heat added to the water by the Pepco plant would aggravate this condition.

(*b*) The location of industries above our intakes discharging sulfates into the river would raise most difficult taste and odor problems, which, however, would not be aggravated by the addition of heat at the Pepco site.

For the above reasons, the prospect of further industrialization is a seriously objectionable feature of the proposed site.

The construction of a large, extensive installation in a low-lying plain of the immediate watershed, such as the proposed site, will give the District of Columbia and its environs a very perplexing problem in meeting its water requirements when storage becomes necessary.

Senator MORSE. The committee will now hear Mr. Favor and then Dr. Renn and we will ask questions of the three.

STATEMENT OF SAMUEL T. FAVOR, WITH CHAS. T. MAIN, INC., CHARLOTTE, N. C.

Mr. FAVOR. Mr. Chairman and members of the committee, we summarize our Report No. 1345–44–1, dated November 3, 1955, on the effect on the waters of the Potomac River of the Potomac Electric Power Co. steam-generating powerplant, proposed for construction in Loudoun County, Va., as follows:

This report investigates the residual temperatures that will be present at the Great Falls (river-mile 126.3) and Little Falls (river-mile 117.4) intakes of the District of Columbia water supplies on the Potomac River, if a steam-generating plant located near Tenfoot Island at river-mile 136.5 on the Potomac River uses river water for cooling water in the condensers. The steam plant is reported to be planned with an ultimate capacity of 600,000 kilowatts, consisting of four 150,000-kilowatt units with the first 2 units to be cooled by the river all the time, and the second 2 units to be cooled by cooling tower systems when the river flow is not sufficient to supply the required quantities.

The residual temperatures for conditions when the river flow is less than 5,000 cubic feet per second and the river temperature is 80° F. or more at coincident times are considered the essence of the problem.

A review of a report dated October 7, 1955, submitted by the Potomac Electric Power Co. on this problem is included in the scope of this report.

The data which we have used to prepare this report has been obtained from the district engineer's staff and published Government records. We have inspected the river at significant points.

Our studies of the recorded data indicate the following general trends:

The coincidence of flows less than 5,000 cubic feet per second and river temperatures of 80° F. or above has occurred for periods of from 1 to 24 consecutive days during the last 14 years. The average yearly occurrence was 15 days during this 14-year period.

We have noted that the existing river-water temperatures follow the daily average dry-bulb air temperatures very closely. This is undoubtedly caused by the shallow water which tends to be heated rapidly by the sun and rocks during the daytime and cooled rapidly by the evaporation and long wave radiation at all times. The relatively large surface area to volume ratio during low flows accounts for the rapid changes in the existing temperatures as compared with those in a reservoir, lake, or other deep body of water.

We believe the speed with which the existing river temperatures vary under existing weather conditions is very important as an indication of the heat dissipation rate when the conditions become unbalanced.

We have noted that differences of one or two degrees are very common and, therefore, indicate that the natural leveling forces are slow at the smaller differential levels while the water temperature drops more rapidly when the differential is increased.

Our approach to the calculations for the rates of heat dissipation to be expected has been based on the following basic assumption: The unknown and variable amounts of heat being added to and subtracted from the river produce a relatively stable condition which results in the existing river temperature. Therefore, we have based all our calculations on determining the effect of the heat added by the condensers only, since all other heat gains or losses are present in the existing conditions.

As a result of our calculations, we have noted that varying the humidity does not materially change the effective rate for the added heat even though the total rate varies widely.

All our calculations have been based on weather conditions with no wind. The rate of evaporation increases about 25 percent for each 1 mile per hour of wind. The mean hourly wind in August, at the Washington Weather Bureau, is 5.7 miles per hour.

The assumed coincidence of the maximum hourly conditions does not materially affect the results.

From our calculations, we conclude that for the normal summer conditions, the rate of heat dissipation by evaporation is increased and the heat load per degree is less for the higher values of river temperature at the source. Therefore, the residual temperature increase above normal at Great Falls will be just about the same for all flows between 800 and 5,000 cubic feet per second at a constant heat load discharged from the powerplant.

Our calculations indicate that it is very difficult to dissipate the last degree or two, particularly when the flow is high enough to absorb the entire heat load in a 1- or 2-degree rise at the source.

When the dew point approaches the river temperature, no heat dissipation to speak of will take place by evaporation and any temperature increase added at the plant will still be present at Great Falls. Since the dew point seldom goes above 77° F. and 82° F. is the maximum, this condition should not occur when the river is above 85° F. Since this is the very humid condition which normally occurs when moisture is plentiful, we do not believe that this condition will be present under the drought conditions which cause the low flows.

The total heat lost by the river is dissipated by several means, of which long-wave radiation and conducted sensible heat are the major methods in addition to the evaporation. We believe that between 10 and 30 percent of the total heat dissipation will be by other means than evaporation.

In conclusion our calculations indicate that during the summer months, when the river temperature is 80° F. or above from natural causes, the addition of the heat from the condensers of a 300,000-kilowatt generating plant at the lower end of Tenfoot Island (river mile 136.5) will result in a temperature increase above normal at the Great Falls intake of not more than 2° F. under the most adverse weather conditions, with river flows as low as 800 cubic feet per second. The corresponding residual increment present at the Little Falls intake would be 1° F.

Since our calculations have been based on evaporation which is the major method of heat dissipation only and the most adverse combinations of weather conditions, we believe that the actual increase will

not be more than 1° at the Great Falls intake and not measurable at the Little Falls intake.

There are certain weather conditions when the dew-point temperature is about the same as the river temperature when very little, if any, heat dissipation will take place if there is no wind. Consequently practically all temperature increase at Tenfoot Island will be present at Great Falls and Little Falls. However, these conditions have occurred only when the river flow is high enough to make the temperature increase less than 1° at the source.

The corresponding calculated increases at Great Falls and Little Falls for a 600,000-kilowatt generating plant would be 3° and 2°, respectively, with an expected actual increase of not more than 2° and 1°, respectively.

The heat load to the river, indicated in the Potomac Electric Power Co.'s report, is in line with the best modern practice and probably can be adhered to within 5 percent variation. The magnitude of the quantities involved in this problem are such that even a 10-percent variation would not affect the practical results.

The consumptive use of 3.4 cubic feet per second for such cooling tower capable of dissipating the heat from a 150,000-kilowatt unit, given in the Potomac Electric Power Co.'s report, is correct. The actual consumptive use, while using the river for cooling, will be somewhat less than this due to other dissipating methods than evaporation which will reduce the total requirement.

We believe that the statement by the Potomac Electric Power Co. in their report which states that they would, if it proved necessary, furnish cooling towers for all units of the station if the future consumptive use of the river for irrigation purposes reduces the flow, covers any problem of thermal pollution which might be present with flows reduced in the future.

Senator MORSE. Mr. Favor, you speak of this as a summary of your report No. 1345–44–1. Do you have the full report with you?

Mr. FAVOR. Yes.

Senator MORSE. May I see it for just a moment?

Mr. FAVOR. Yes.

Senator MORSE. It will be marked for purposes of identification as "Exhibit No. 2" in this hearing, a report entitled "Report on the Effect of the Proposed PEPCO Plant on Potomac River Temperatures," by Chas. T. Main, Inc.

(The document was marked as "Exhibit No. 2," and will be found in the files of the committee.)

Senator MORSE. I shall now call on Dr. Charles E. Renn, of Johns Hopkins University, for his statement. We will then proceed with the examination of the three witnesses.

STATEMENT OF CHARLES E. RENN, PROFESSOR OF SANITARY ENGINEERING, THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD.

Dr. RENN. Mr. Chairman and gentlemen, I have reviewed the technical literature and other experience records pertinent to environmental changes that may be anticipated in the Potomac River water supply to the District of Columbia when power generating facilities

projected by the Potomac Electric Power Co. are placed in operation.

The factors that I have examined include the relationships of rising water temperatures produced by waste heat discharge upon—

1. the bacteriological and chemical quality of water to be treated;
2. the efficiencies of water treatment processes; and
3. the potability of the treated water.

In this analysis I have assumed that two conditions may prevail: That the projected power plant may be the only modifying mechanism, and that increased urban and industrial development may follow its establishment on the watershed near Washington.

I have also considered the potential effects of several power industrial type wastes rising from steam-generated electric power operations upon the quality of water available to the District. These wastes include phenolic extractives from oil blanketed stored coal, acid and detergent cleaning agents, blow-down wastes, regeneration wastes from demineralization of makeup waters, chlorides originating from chlorine desliming of heat exchanger surfaces, and salts leached from ash storage.

The studies of Mr. S. T. Favor, of Chas. T. Main, Inc., show that substantial heating of the river at low flows will be limited to areas above the Great Falls intake and that the maximum temperature rise that may be expected at this point will be between 1 and 2 degrees Fahrenheit under special combinations of weather and river temperature. The river temperatures in the upstream direction will rise as we approach the plant outfall, ultimately to discharge temperatures in the reaches above complete mixing.

The principal effects of heating the river should show themselves in the waters before they reach the District's reservoirs and treatment plants. We should also be concerned with changes that may be projected with the flowing water.

Effects of rising temperature upon bacteriological quality of water: Water serves as a mechanical medium for the transmittance of intestinal disease; the micro-organisms associated with waterborne diseases do not multiply in natural waters. Special conditions provided by the human host and by rich laboratory nutrient media are required for their culture. Even in waters bearing wastes in excess of those carried by the Potomac above Washington's intake points, disease-producing bacteria and parasites die off more rapidly than they can reproduce. Natural waters do not supply nutrients to maintain growth; the specialized requirements of parasites and pathogens cannot be met, and death follows the exhaustion of the stored energy carried by the starving cells. In addition, the competitive, antagonistic, and predatory action of water and soil bacteria, viruses, protozoa, and small bacteria-eating animals continuously reduce the less well adapted pathogenic population.

All of the changes that destroy waterborne pathogenic organisms in natural waters are speeded up by rising temperatures. This has been demonstrated both in laboratory experiments with pure and mixed populations of intestinal organisms and by field experience. Bacterial pollution moves farther downstream in cold water than in warm water. All experience indicates that the population of intestinal bacteria and other parasites carried by the Potomac should decrease,

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rather than increase, if the temperature of water above the intakes rises in the projected range.

At the same time it is likely that the total population of harmless, natural waterborne bacteria will increase. This poses no serious problem in water quality or treatment operations. The populations of these forms normally fluctuate greatly with floods and drought. When water passes through the heat exchangers, it is to be expected that a fraction of the microscopic plant and animal life will be killed. The organic debris returned to the river in the warm effluent will be decomposed by a variety of bacteria and protozoa, and this conversion will be reflected by sudden rises in new populations.

Other changes will follow which may be slight or significant, depending upon the state of the water. At present, waste loadings of the Potomac above the falls contain relatively few living micro-organisms and little decomposable organic matter. The changes that occur when this material is reorganized into new bacterial cells will require little oxygen, and this is readily supplied by regeneration.

If progressive industrial and urban development on the nearby watershed enriches the water above the powerplant to levels that support large populations of algae, small animals and bacteria, the heat catastrophe in the plant's exchangers will initiate rapid organic reconversion processes that project sudden high oxygen demands downstream. These may be met in the shallow, well stirred river above the intake at Great Falls, but the rate at which oxygen can be supplied to the deeper, quiet, slowly exchanged waters of Dalecarlia Reservoir, for example, may be insufficient.

It is common, too, in areas of heavy industrial development, to find that odor- and taste-producing blue-green algae form overgrowths when heavily polluted waters are warmed. Most of the cases that have received attention represent slow-flowing, deeper streams. We should regard Washington's water storage reservoirs as stagnant parts of the water system, in which increased accumulations of settleable organic materials form the practical limits to waste loadings that may be tolerated in the river.

The temperatures of waters at the point of treatment promise to be at levels close to those prevailing before power generating operations. Some apprehensions may be alleviated by pointing out that temperature rise in the water is likely to make treatment more efficient. Suspended impurities settle more rapidly during reservoir storage of warm water; alum flocculation is more effective and chlorine disinfection more rapid at elevated temperatures; and filtration rates are higher in upper temperature ranges than in cold water. At the same time, a warm water that is safe to drink is less palatable than cold water. It is desirable for many reasons to deliver the coldest water that can be developed.

Industrial type wastes produced by power generation: Steam power generating plants produce a variety of waste waters. A screening analysis of the magnitudes involved in the Potomac Electric Power Co.'s operations indicate that these wastes are either insignificant or manageable. Most prominent among the waste waters are the leachings from oil blanketed coal stores. These are a potential source of unpleasant chlorinous odors and tastes in the chlorine disinfected drinking water supply. Removal of these troublesome materials at the

water treatment plant will markedly increase the cost of water to the District.

The refining industry and various cresol waste-producing industries have successfully treated similar wastes before admitting them to the streams. On the other hand, it may prove practical to substitute other coal-pile coatings. The Potomac Electric Power Co. is aware of the waste problem posed by their fuel storage. We cannot assume that the problem does not exist because solutions are promising; however, it may prove necessary to establish defenses at the District's treatment plants.

Before the plant is placed in operation, boilers must be cleaned, and acid detergents must be disposed of. This is a single treatment. Plans for dilution, or total removal of this waste, will depend upon a detailed analysis of the materials.

The periodic regeneration of makeup water demineralizers will increase the sulfate content of the river at low flows (taken at 1,000 cubic feet per second) by about 1.5 percent, raising the existing levels of approximately 30 parts per million sulfate by 0.44 parts per million. This is an insignificant change, but it assumed efficient operation and regulated discharge.

Chlorides will be appreciably increased in the immediate area of discharge by cooling water chlorination. Over the 3 daily half-hour intervals of treatment, the chloride content at the point of mixing may rise to about 10 parts per million above present levels of 5 to 10 parts per million. These peaks will be spread during downstream flow so that clorides at Great Falls should approach average continuous levels of increase of about 0.6 parts per million. This is a physiologically insignificant change and will not alter the taste or odor of the water.

If phenolic wastes from future upstream industries enter the chlorinated stream or mix with waters containing chlorine residues from the powerplant outfall, odor and taste-producing chlorphenols may be anticipated at Dalecarlia and below. The operations of a number of industries frequently make tangled waste problems in the receiving waters.

Fly ash storage leachings will be alkaline. If we assume the extreme case in which all of the calcium in the daily ash production is converted to calcium bicarbonate and carbonate in the Potomac River at summer flows of 1,000 cubic feet per second, very low flows, or eight-tenths percent of the time, it appears that the added hardness will be barely measurable—about 0.6 parts per million in a normal summer hardness background of 100 parts per million. In alkaline ash, it is unlikely that any added iron will be developed.

It is important that the projected storage lagoons really function as settling and equalizing systems, and that they be secure against flood. The discharge of fly ash to the river produces a readily sloughed film which carries algal slimes and other adhering materials downstream in waves. Shock loads to the reservoir at Dalecarlia may be troublesome odor producers.

There are no predictions that can be made with reliabilities satisfactory to engineers concerning the effects of rising, diverse waste loads in the plant area. These are certain to come, and the practical question is that of discovering the level of development at which we must add more treatment facilities to furnish acceptable water. Be-

fore this happens, there are certain to be incidents and occasions when even the most vigilant operation will not be able to catch pollutional waves that are projected downstream to the water plant. The relatively high sulfate content of Potomac River water makes the system sensitive to oxygen depletion in reservoir storage before treatment. When the organic load of the river goes up, as it must with industrialization and urban development of the watershed near Washington, there will be intervals in which hydrogen sulfide will appear in Dalecarlia and other storage areas. This will require drastic changes in operation and treatment, and the water will have unpopular days.

Deterioration of river supplies takes place in step increments. My best projection is that we will have incidents of anaerobic, black, unpalatable water in Dalecarlia before a population equivalent of 200,000 in the form of industrial wastes or untreated sewage is reached in the area 10 to 15 miles upstream from Great Falls. If the wastes are treated, a population and industrial development of, roughly, five times this level may be supported. Even with treatment, however, the inevitable fertilization of the stream will produce heavier growths of odor and taste-producing organisms. This estimate assumes that the shallow, broad riverbed has high self-purification capacity, and that the full waste load will not reach the water-storage reservoir. Pulses of suspended organic sludges will be projected into this storage. This unpredictable feature is the controlling condition that will make our present water treatment ineffective and obsolete.

Senator MORSE. Thank you very much, Dr. Renn.

Colonel Adams, do you have any other witnesses that you would like to present at this time?

Colonel ADAMS. No other witnesses.

Senator MORSE. Very well, we will proceed to ask some questions of the three of you. Do you have any questions Senator Beall?

Senator BEALL. Not at this time.

Senator MORSE. Congressman Smith?

Mr. SMITH. No questions at this time.

Senator MORSE. I want to go back to your conclusions, first, Colonel Adams. In the light of the testimony by Mr. Favor and Dr. Renn, let us dwell a moment on your summary (A):

> the location of two medium-sized industries discharging organic wastes, within a 10-mile reach upstream of the Pepco site, would support aquatic growth, giving rise to serious problems of water taste and odor. The heat added to the water by the Pepco plant would aggravate this condition.

Am I correct in my conclusion from what Mr. Favor and Dr. Renn testified that the change in temperature at both Great Falls and Little Falls would not be sufficient to produce any organic growth that would in any way be a serious hazard to health if we could just assume that there would be no increase in the temperature of the river from any other plant, but would be limited entirely to the Pepco plant? Is that a fair conclusion?

Colonel ADAMS. I would not say that it is, no, because Mr. Favor's very low degrees of change that he spoke of are at Great Falls and at Little Falls, but he finds, and it is shown in the curves in the full report, that just below the outfall of the cooling water used by the plant there would be 300,000 kilowatts at 14° F. of rise. So the phenomenon that Dr. Renn is considering has for its environment about

a 10-mile reach of the river in which you start off with a 14° increase and then the temperature decreases on a curve a little more rapidly at first, and then leveling out as it gets down more closely to the normal temperature. And anything that would be affected by temperature would have to occur in this reach, and almost entirely in the upper portions of the reach, I would say something in the order of the upper third or so of the reach, if it is affected by temperature.

Another thing that Dr. Renn has brought out is that plant growth algaes require food just like any other plant, and they require hydrocarbons for their food. And that there is not enough organic content in the river at this time to support any significant growth of algaes.

So my conclusion (A) is based first on the addition of sufficient organic matter to provide the food by the location of industries, discharging organic wastes. Whether or not there was any heat added to the water industries of that kind would give us an algae problem. The heat added to the water, we believe, would to some extent aggravate the condition in furnishing a little better heat environment in the immediate area of the plant and for some 2 or 3 miles downstream for the growth of algae.

I think the most significant thing about further industrialization is to what extent it may be coupled with the acquisition of that site.

Senator MORSE. I am going to come to that in a moment. I want you to take me by the hand again and lead me back through this problem of the effect on health hazards, and the effect on the so-called odor and taste hazard, because as I listened to you gentlemen we have two problems so far as the effect on the quality of the water is concerned.

We have the question as to whether or not the construction of this plant alone, leaving for a moment a discussion of other industrialization, will raise the temperature of the river in this region of the river so as to create a health hazard at any point of the reach.

As I understood Dr. Renn's and Mr. Favor's testimony, the increase in temperature at Little Falls and Great Falls will be somewhere between 2° at Great Falls and 1° at Little Falls, and that change of temperature at those two points would not create any effect on the organisms of the river, so as to create a health hazard. Colonel Adams points out that for about one-third of that reach you are going to get temperature changes up to 14°, and that when you get a temperature change of that amount, then you produce changes in the organisms of the river, which might very well create not only an odor and taste problem, but a possible health problem.

Is that a fair statement?

Colonel ADAMS. There will be no health hazard created under any of these conditions. We have found that there can be no increase as a result of the heat or any of these conditions on pathogenic bacteria. The pathogenics are the ones that cause diseases, the health hazards. So we can completely discount the health hazard aspect.

Senator MORSE. Good. I have that clear then. So far as the temperature change resulting in the development of any organisms that might be a threat to health we can eliminate consideration of that possibility?

Colonel ADAMS. That is correct.

Senator MORSE. But it is your testimony, Colonel Adams, that the increase in temperature, at least in a third of the reach of the river

would be sufficient so as to increase the plant growth and organic growth that would affect taste and odor?

Colonel ADAMS. I would like to take that in two steps to be more definitive in this thing. With the other river conditions as they are today, there is not enough organic material in the water to support significant harmful plant growths. So with all other conditions in the river as they are today, considering the Pepco plant alone, the introduction of heat into the water will not create taste and odor problems. Therefore, with all other conditions as they are today, the Pepco plant alone will not give us any problems in water use, certainly no significant problems.

Now, the next step is looking to the future. If there is a pollution load added above the Pepco plant, the equivalent of two medium sized industries engaged in manufacturing processes in which they discharge organic wastes, those wastes would then supply the plant food required and we would expect to have problems with algaes, a form of minute plant growth which, in turn, would give us taste and odor problems.

With such industrialization, we would expect to have those problems with or without the Pepco plant.

We believe that with those problems the heat dissipated into the river by the Pepco plant would aggravate the problem to some degree in the reach from the plant down the river to a point where the heat was dissipated so that it was no longer particularly significant. Now that, of course, introduces a differential between what we would have with the industrial wastes with or without the Pepco plant. And I do not believe that I can evaluate that differential in a very definitive form.

If Dr. Renn can contribute further to that, I would like to have him do so.

Dr. RENN. The difference that you noted is perfectly correct but we have very blue-green algae in the supplies present. This is, in general, the group that gives us trouble with taste and odor. These appear when the water becomes highly enriched and, especially, when the water is hot. It can be very well under those conditions that they can breed.

In a shallow river like the Potomac, most of these will be forms that attach themselves to the bottom, to rocks, so that the effect of local heating would be to produce an area of accelerated growth. If you flew over the area you could see this in warm water outfalls. They are marked early and late in the season by this coppery green color.

In those cases, usually there is an organic component in the hot waste. In this way, it would be the organic components that would come from above. That effect would extend the growth season. It would start earlier and go later in the season.

Senator MORSE. Still holding myself to item A in Colonel Adams' summary—and may I say, good naturedly, what is very clear to you professionals is not necessarily clear to those of us who have to learn this as we go along.

Devoting myself to item A in Colonel Adams' summary, am I correct in drawing this conclusion: If you could take this Pepco plant problem alone and if you could assume that it represents the only industrialization in this area in perpetuity, and if you could assume,

second, that population will remain constant in this area so that the only effect on the stream will be the operation of the Pepco plant and the heating of the water to the extent that that operation would heat it, with your substances in the stream remaining the same, there would be no effect either on taste and odor, or on the health quality of the water.

That is a fair conclusion?

Dr. RENN. Yes.

Senator MORSE. All right, the next step. However, if you assume, as Colonel Adams apparently assumes in item A, that you will have an increase in industrialization in the area equal to two medium-sized industries discharging organic wastes within a 10-mile reach upstream of the Pepco site, that such an additional factor would result in sufficient aquatic growth in the river to give serious rise to a problem of taste and odor, but not to health?

Dr. RENN. That is right.

Senator MORSE. Therefore, the committee must give consideration to whatever further is put into this record as to what the industrialization effect will be of starting an industry at this point on the river.

That involves one of the assumptions, that is the problem that you gentlemen took into consideration in making the assumptions that you made in presenting your findings; is that correct?

Dr. RENN. Yes.

Colonel ADAMS. That is correct.

Senator MORSE. So that takes us into point B of your summary, that—

The location of industries above our intakes discharging sulfates into the river would raise most difficult taste and odor problems which, however, would not be aggravated by the addition of heat at the Pepco site.

Because of the aquatic growth that those additional plants upstream would produce in the river, then the heat produced by the Pepco operation would have an effect on taste and odor?

Colonel ADAMS. We believe that it would, by the route of aquatic growth only.

Senator MORSE. So that you draw the conclusion on page 19, of your written statement that the prospect of further industrialization is a serious matter to be considered in connection with this particular request for the construction of this plant, because of your assumption that as you start this industrial plant, it is to be expected that more will follow. In other words, an area will become an industrial zoning area?

Colonel ADAMS. That is correct.

And my concern with regard to this site is increased by the press reports, which included a quotation of Mr. Bissett, senior vice president of the company, indicating that the company had entered into certain agreements as part of their contract with the land syndicate, whereby they would cooperate fully with the syndicate in efforts to gain and implement industrial zoning of the remainder of the land held by the syndicate, which associates it more particularly with this site.

Senator MORSE. We will come to that matter later when we listen to the representatives of the company.

Colonel ADAMS. Yes, sir.

Senator MORSE. I would like to proceed here for a moment in the consideration of a hypothetical, based upon the assumption that the company is interested only in this one industrial plant.

Colonel ADAMS. That is right.

Senator MORSE. And not in any other industrialization.

This hypothetical raises this question: Is it your opinion that an industrialization at this reach of the Potomac River, by the establishment of this kind of an industrial plant, in the course of ordinary operation of economic events, would be conducive to further industrialization in that area?

Colonel ADAMS. It is my opinion that it would be conducive to further industrialization, due to one source only, that is, that it requires railroad facilities to supply coal to the plant.

And it would seem to me that the existence of a railroad line into an area would facilitate extension of spurs to serve other industries. However, there would, of course, be other sites for other industries where they could have spurs readily brought in off the railroad in other locations, but that is the only thing inherent in this that I could see that would cause other industries to follow in the wake of a power-plant, in case there might be some condition which would facilitate the provision of railroad service.

Senator MORSE. Would the building of railroad tracks to serve this plant or to get coal and other supplies to it, naturally increase the value of the surrounding property for industrial purposes, and decrease it for residential purposes?

Colonel ADAMS. Well, it is my opinion that it would, to some degree.

Senator MORSE. It seems to me, as committee members, we have to deal with these possible conjectures and hypotheticals. A plant such as this, being a coal-burning plant—and I am strong, may I say, for the use of coal, and I am strong for the development of facilities that will give us coal-burning plants, since particularly on a recent visit to eastern Kentucky it disclosed 200,000 fellow Americans on surplus food relief, at the present time as we sit in this room. There are tens of thousands more in the State of Pennsylvania on surplus food relief. That is because of what has happened to the coal economy. In West Virginia, there are also thousands of surplus food relief miners. We have a coal problem.

So the Senator from Oregon is anxious to do what can be done to help increase the use of coal.

But we are confronted here with a specific proposal, according to our assumption, that raises the question as to whether or not the location of this industrial plant at this point will not tend to increase industrialization and make the property more valuable for industrial purposes and less valuable for residential purposes, if for no other reason than you do not operate these plants without chimneys—you do not operate them without the other physical characteristics of an industrial center. If you are buying a suburban home, you are going to be inclined to buy a situs where you do not look to a chimney, that is, an industrial chimney and a coal-burning smokestack.

Is that not true?

Colonel ADAMS. That would be my inclination, if I were buying a home.

Senator MORSE. So you, in the preparation of your brief on this matter, proceeded on the assumption that we must take into account

the probability or possibility of this plant being the bellwether to further industrialization in the immediate area of the plant.

Colonel ADAMS. That is correct.

Senator MORSE. All right.

Assuming for the sake of argument, then, will further industrialization at this site of the proposed Pepco plant increase water problems for the District of Columbia in the years ahead?

Colonel ADAMS. It will.

Senator MORSE. Is it your argument and testimony that it may very well create problems in respect to, No. 1, a supply of water, and, No. 2, taste and odor, and conceivably, depending upon the nature of the industrialization, also health?

Colonel ADAMS. It is my opinion that it will raise serious problems in the supply and in taste and odor. I cannot see any problems which should not be capable of being solved as to the health hazards.

I am neither a chemist nor a bacteriologist, and I would presume that the water control agencies of the States would not permit wastes containing chemicals harmful to health, which could not be handled readily by treatment to be discharged into the river.

As to the pathogenic bacteria, I would not anticipate any great problem. There again, I would assume that the control agencies would not permit raw, untreated sewage generated by the employees of the plant, at the plant, and by houses that grow up around the plant, to be just discharged into the river.

I think we have to assume that sort of regulation by the proper State agency.

Senator MORSE. I will pause at this point. There are other independent subjects that I want to examine the witness on.

Do you have a question?

Senator BEALL. Go ahead and finish with the witness. I have some suggestions.

Senator MORSE. I thought that you might want to ask questions at this time. You may feel free to interrupt at this time.

Mr. SMITH. I would like to supplement this a little bit by one question.

Colonel Adams, your apprehension as to the future is related only to future industrialization of the area, further up the river?

Colonel ADAMS. That is correct.

Mr. SMITH. And that danger exists, whether the Pepco plant goes there or does not go there?

Colonel ADAMS. I think it does, to a certain degree.

Mr. SMITH. And do you not think that we can assume that when that danger arises that you will be having a similar hearing here to do something about it, to see that the water supply of Washington is not endangered?

Colonel ADAMS. I would certainly hope that sort of interest would be taken.

Mr. SMITH. Certainly. That is all.

Senator MORSE. On that point, Colonel Adams, would you say that you are testifying today on this problem because you see this as the beginning step, if this plant is established, of an industrialization problem in this area that may threaten the future supply of the District water?

Colonel ADAMS. I do look upon it as a beginning step.

I think that inevitably some degree of industrialization would follow in the wake of the plant due to the change in the environment of the area, making adjoining land less desirable for residential development and the facilitation of railroad service that would be provided by the necessity of having railroad service into the power-plant.

Senator BEALL. Mr. Chairman, does it not naturally follow that when a railroad is built at large cost that the company is going to look for and encourage other industrial plants to come in there and utilize the facilities of the railroad after it is built?

Colonel ADAMS. I should think that would be their inclination.

Senator BEALL. It is the natural thing to do. Perhaps it would not justify a railroad company or a private company building the spur in this vicinity now, but if this were built anyhow, they would use the full facilities of the siding or of the spur.

Colonel ADAMS. I think that is a fair assumption.

Senator BEALL. And induce other industries to come there?

Colonel ADAMS. Yes.

Senator MORSE. On page 13, to emphasize the point in the record, you stated:

> However all industrial effects are pertinent to Pepco's proposed site in view of the company's reported agreement with the land syndicate to assist in gaining further industrial zoning. The prospect of further industrialization of the area is a very disturbing element.

It is your testimony that the concern of yours over this being the first step in what may very well be an industrialization of this area and the effect of that on the future water supply of the District is the reason you are raising what amounts to a warning signal to us today?

Colonel ADAMS. That is correct.

Senator BEALL. That naturally follows when you have a railroad in there.

Senator MORSE. Yes; I think that that is a very important factor that we must take into account in going over the whole project.

Now I want to come, Colonel Adams, to what I understand to be your second main contention; namely, that you fear that the construction of the plant at this particular point will, over the years, result in serious water-supply problems for the District of Columbia and other localities on both sides of the river dependent upon the Potomac River water for their water supply, because by the year 2000, the Army engineers feel that some dams are going to be needed to be constructed for water-supply storage, including one at what you call the bend of the river.

Colonel ADAMS. That is River Bend.

Senator MORSE. At River Bend. Is that a fair statement on my part?

Colonel Adams. It is except instead of the year 2000 we believe that the District of Columbia may be immediately confronted with this requirement by the year 1970. The figures that I quoted in my prepared statement were a 1970 projection.

Senator MORSE. You are correct.

Colonel ADAMS. And I have a footnote on page 16. There is a recap of the water demands forecasted by the year 1970 of the users

listed in million gallons per day. We list Washington aqueduct at 312 million gallons per day; the Washington Suburban Sanitary Commission at 20 million gallons per day; Fairfax County, Va., at 15 million gallons per day; Frederick, Md., at 7 million gallons per day; Rockville, Md., at 3 million gallons per day; and supplemental irrigation at 160 million gallons per day. And pollution abatement at 650 million gallons per day.

And for a total of 1,167 millions per day. We believe that we have been conservative in that forecast.

Senator BEALL. Mr. Chairman, he has not mentioned it, but I think it is well for the record to show that the colonel is conservative, because Hagerstown, Md., contemplates drawing upon the river for additional supplies.

Colonel ADAMS. That was not information that I had. I did not have that.

Senator MORSE. Bearing on that point, I call your attention to your statement at the top of page 16 that I want to examine you about. [Reading:]

> It is now becoming apparent that our assumption in preparing the plan published in House Document 480 was unduly optimistic when we forecasted that impoundment of water in storage reservoirs would not be required before the year 2000. It appears probable now that this requirement may have to be met in the course of the next 15 years. We have made very quick preliminary studies of the storage pool that would be required to meet the water demands of Washington aqueduct if a dam were constructed at the River Bend site just below Pepco's proposed location. This was found to be the best site for a dam of all of the 14 sites that were studied by the Corps of Engineers in 1942, 1943, and 1944 in connection with comprehensive development of the Potomac River as a civil-works project. The results of our studies to determine the water storage pool level can be considered only approximate because we geared our time allowance to the date set for this hearing.

My question is this: If in 15 years it becomes necessary to build a dam somewhere for the storage of water to supply the District of Columbia, and these other localities with the water from the Potomac, you cannot build it at River Bend because of the Pepco plant, assuming that it is constructed in the meantime. Would the resulting cost to the District of Columbia in building a dam elsewhere in order to get the water storage be considerable?

Colonel ADAMS. The cost would be considerable. I am not prepared to testify as to the relative costs of building a dam at River Bend or building at some upstream point at this time, because we have not developed our studies that far for water-supply purposes.

Senator MORSE. But it is your opinion that when such a study is prepared it will show that it would be considerably more than would be the case if you could build at River Bend?

Colonel ADAMS. I do not believe that I could support an opinion at this time that it would be considerably more. There are undesirable features, however, in going upstream on one of the tributaries. By so doing control is lost of water use in the river between the dam and the water intakes of the District of Columbia.

Also, a vast watershed area is made subject to pollution of the flows, whereas, I believe that there would be a little more natural self-purification of the same pollution if it had to stand in a large reservoir.

There is another difficulty in the regulation of reservoir discharges. If you have your reservoir several days flow time of the water up-

stream of your intakes, you have a great deal more guessing to do, you might say, as to whether to increase your releases or not. In a dry period, in a period that has been dry where the waterflow is low. But with rains possibly threatening, you have got to make your decision several days in advance.

Whereas if your dam is close to your intake and you have only 15 or 20 hours' flow, you have less than a day to consider. And that will inevitably result in a considerable amount of water wastage. I understand in many reservoirs that is one factor in control that becomes very consequential with the amount of water that has to be stored to meet a given net requirement.

Senator MORSE. One or two more questions. Then I want to take up Report 480.

Am I correct in my understanding that, if Pepco is allowed to build the plant at the site which it is requesting permission for, a subsequent building of a dam for water-storage purposes at River Bend would flood out the Pepco plant and, therefore, it would be necessary for us to pay Pepco, that is, the Government, for the damage that would result therefrom?

Colonel ADAMS. If it were located on the site in question, that is true.

Senator MORSE. The position of the Army engineers then is that the best site from an engineering standpoint, and for the purpose of adequate storage supply of water for the District of Columbia by the year 1970 is the River Bend site?

Colonel ADAMS. Yes, sir; that is true.

Senator MORSE. Therefore, it follows that if Pepco is authorized to build at the site for which it has requested permission, we are, in effect, taking away from the District of Columbia an economical opportunity to build a dam at River Bend?

Colonel ADAMS. That is true.

Senator MORSE. Is it fair to say that one of the reasons for your presenting the statement that you have today is because you think consideration should be given to the Army engineers' comprehensive program for the development of the water-supply potentialities of the Potomac River for future generations of people living in this area?

Colonel ADAMS. Well, my reason for bringing this to your attention today is that whether or not the comprehensive plan for the development of the Potomac Basin is implemented, the District of Columbia and its environs still face the necessity that it will be essential that they store water in order to have an adequate supply by around the year 1970.

And I think it is very important that the committee give consideration to the strong probability that its desirable storage area can be so developed as to be priced completely out of reach, and the construction of the Pepco plant at this Loudoun County site would place an installation in there that would cost something in the order of $100 million to buy, according to the present costs, and also there would be the problem of suddenly taking out of service at least 300,000, possibly more, kilowatts of electric capacity that by that time would be in service and integrated into the area.

It is two problems, which in my opinion, would make it completely impracticable to give any consideration to acquiring the plant and using that reservoir site.

Senator MORSE. Now you refer on page 17 to House Document 480, 79th Congress.

Colonel ADAMS. Yes, sir.

Senator MORSE. This is the report of the Chief of Engineers submitted to the Congress back in 1946, is it?

Colonel ADAMS. No, sir. House Document 480 is the report of the Chief of Engineers on the master plan of capital expansion of the Washington Aqueduct to meet the water requirements of the District of Columbia. One correction: It was submitted jointly by the Corps of Engineers and the Commissioners of the District of Columbia Government. And it constitutes the master plan and, also, the congressional authorization under which capital expansion of the Washington Aqueduct is constructed.

Senator MORSE. That is where the recommendation was made for a dam at River Bend?

Colonel ADAMS. No, there was no mention in House Document 480 of that. House Document 480 projects the capital expansion requirements up to the year 2000. And at the time that the House document was prepared it was the opinion of the Washington district and the District Commissioners that water storage would not be required by the year 2000. Therefore, there was nothing placed in the document pertaining to water storage.

Senator MORSE. Do you have a copy of Report 480 with you?

Colonel ADAMS. Yes, sir.

Senator MORSE. I shall ask the clerk of the committee to produce for the committee a file copy of House Document 480, which will be marked as "Exhibit No. 3." It is entitled "Adequate Future Water Supply for the District of Columbia, Metropolitan area, House Document 480."

(The document referred to was marked as "Exhibit No. 3" for the purposes of this hearing, and will be found in the files of the committee.)

Senator MORSE. Now, Colonel Adams, in 1946 the Chief of Engineers issued a report, did he not, on a preliminary examination and survey of the Potomac River and its tributaries?

Colonel ADAMS. Yes, sir; that was published as House Document 622, 79th Congress, 2d session.

Senator MORSE. That will be marked for purposes of identification as "Exhibit No. 4," a document numbered House Document 622, entitled "Potomac River and Tributaries, Maryland, Virginia, West Virginia, and Pennsylvania."

(The document was marked as "Exhibit No. 4," and will be found in the files of the committee.)

Senator MORSE. It is true, is it not, that House Document 622, which is the document my previous comment had in mind, was one that recommended a dam at River Bend?

Colonel ADAMS. That is true.

Senator MORSE. And it is House Document 622, in which the Army engineers set forth a series of recommendations for storage dams up the Potomac and its tributaries to protect the water supply of the area and to meet the supply needs of the future?

Colonel ADAMS. That is correct. It was, and more specifically the district engineer, Washington District Corps of Engineers, and the

division engineer recommended a project consisting of 14 dams and reservoirs with the pertinent works.

Senator MORSE. Is it true that those recommendations were not dependent upon the building of the comprehensive plan in total, but could be built segment by segment as needs developed, starting, for example, with the storage dam at River Bend?

Colonel ADAMS. That is true. The recommendation of the district engineer and the division engineer was that the project be constructed over a period of about 20 years and that the initial project at River Bend site be authorized at an early date.

Senator MORSE. Does it follow from that statement that the engineers considered a storage dam at River Bend to be of great importance to control of the water supply of the District area in the future?

Colonel ADAMS. It not only follows that a reservoir at River Bend is considered very important from that viewpoint, but in the comprehensive development of the river this reservoir as well as the other reservoirs, also would serve the purpose of flood control by storing flood crests until they could be released more gradually.

Senator MORSE. That was the third general subject I was going to examine you on. I am perfectly willing to move into it now.

My first was health and taste and odor of the water resulting from temperature changes which we have already covered. The second was this matter of protecting the future supply of water for the District and the other localities that are dependent upon that supply. The third is the effect that the location of the Pepco plant at this point might have on flood control programs of the future; you having mentioned it, we can dovetail it with the second point.

My question is this: Would the building of the Pepco plant at this site and the automatic elimination of the dam at River Bend create problems for the engineers in respect to effective flood control?

Colonel ADAMS. It certainly would. The River Bend Reservoir in the 1946 report was the key reservoir of the entire 14 reservoir system. And taking a flood of the magnitude of 1936 for example, the River Bend Reservoir alone would reduce the flood crest 7.4 feet. And the entire project, including the other 13 dams, was 9.4 feet.

So River Bend alone would take 7.4 feet off the 1936 flood crest.

Senator BEALL. Without the other dams?

Colonel ADAMS. Without the other dams.

Senator MORSE. Would the other dams, supplementing the River Bend Dam, reduce that crest further?

Colonel ADAMS. That would reduce it another 2 feet, to about 9.4 feet. And the other dams then, of course, would provide or would relieve floods upstream above River Bend Dam, which would not be effected by the River Bend Dam alone.

Senator MORSE. Am I to understand that the proposed River Bend Dam is the key dam in the Army engineers' flood-control program for the Potomac?

Colonel ADAMS. It is. And it is the basic reservoir upon which the total economic development depends. I do not believe that without the River Bend Dam that a favorable benefit cost ratio could be shown for the comprehensive development.

Senator MORSE. Am I to understand then that the River Bend Dam, in the opinion of the Army engineers, is essential in the future both for flood control and water supply?

Colonel ADAMS. That is correct.

Senator MORSE. Do you have available, or can you supply the committee data which will show the financial losses to this area of the country, including losses to the District of Columbia and to Maryland and Virginia from floods in the last half century?

Colonel ADAMS. I do not have the data immediately at my fingertips, but I can supply it for the record.

Senator MORSE. For the record, Colonel Adams will supply a memorandum which will be inserted at this point into the official record, setting forth the computation of the Army engineers as to the financial losses resulting from floods on the Potomac for the last half-century, if you have data which can go back that far.

Colonel ADAMS. Very well.

(The information is as follows:)

The appended tabulation summarizes flood damages which have been reported in the Potomac River Basin since 1924 exclusive of those which occurred in the Anacostia River Basin, at Cumberland, Md., Ridgeley, W. Va., and at Bridgewater, Va., in which areas local flood protection works have been completed or are in process of construction. No consistent record of flood damages have been recorded prior to 1924.

The figures reported have not been adjusted for changes in price levels or for changed conditions due to increased developments in areas subject to flooding. The total recorded damages for these major floods is approximately $30 million and with allowances for such damages as occur annually from minor freshets, it is estimated that this total could be increased to $35 million. The average unadjusted annual average for the 31 years of observations would be approximately $1,130,000.

Total reported flood losses

	1936	1937	1942	1949	1954	1955
Main Potomac	$3,365,000	$10,000	$2,319,000			$100,000
North Branch	1,135,000	3,500	188,000		$1,453,000	440,000
South Branch	1,283,000		116,000	$6,000,000	114,000	410,000
Shenandoah	341,000		263,000			2,600,000
North Fork	694,000		326,000			
South Fork	579,000		394,000	3,057,000		
South River	237,000		296,000			
All other streams	2,791,000		483,000			950,000
Total Potomac Basin, exclusive of the Anacostia Basin, Cumberland, Md., Ridgeley, W. Va., and Bridgewater, Va.	10,425,000	13,500	4,385,000	9,057,000	1,567,000	[1] 4,500,000

[1] Preliminary figure.

Recapitulation

Total Potomac Basin, exclusive of the Anacostia Basin, Cumberland, Md., Ridgeley, W. Va., and Bridgewater, Va.:	
1936	$10,425,000
1937	13,500
1942	4,385,000
1949	9,057,000
1954	1,567,000
1955	4,500,000
Total, all floods since 1924	[1] 29,947,500

[1] Rounded to include minor floods and unreported damage, estimate $35,000,000 or an average of $\frac{\$35,000,000}{31}$=$1,130,000 per year.

Senator MORSE. At this point for today's hearing, can you give us any testimony as to losses of the 1936 flood?

Colonel ADAMS. I would like to ask Mr. Birrell at this point if he can readily supply any indication to the committee from the report.

Senator MORSE. The hour being almost 12:30, we will recess until 1:45 o'clock.

We stand in recess.

(Whereupon, at 12:30, a recess was had, to resume at 1:45 p. m., the same day.)

AFTERNOON SESSION

Senator MORSE. The hearing will come to order. I understand that Mr. Birrell will now comment on the question that I had raised at the time of recess this morning relating to this matter of flood control in relationship to the River Bend Dam and its effectiveness in checking floods or reducing their seriousness at least and anything that you have in regard to the savings that would result from the construction of the dam and anything else you wish to say about it.

STATEMENT OF COL. RAY ADAMS, DISTRICT ENGINEER; ACCOMPANIED BY SAMUEL T. FAVOR, ASSOCIATE, CHAS. T. MAIN, INC.; DR. CHARLES E. RENN, PROFESSOR OF SANITARY ENGINEERING AND WATER RESOURCES, JOHNS HOPKINS UNIVERSITY; BYRON BIRD, CHIEF, WATER SUPPLY DIVISION, WASHINGTON, D. C.; D. V. BIRRELL, CHIEF, ENGINEERING DIVISION, WASHINGTON DISTRICT—Resumed

Mr. BIRRELL. To start out I think it is necessary to point out there is a flood protection project in the city of Washington which most of us may not be aware of, consisting of a levee extending from Washington Monument to the Lincoln Memorial; 17th Street passes through this levee. During a flood emergency it would be necessary to erect temporary closure structures at 17th Street. That structure for floods up to 700,000 cubic feet per second would protect Government property which in 1945–46 was evaluated at $300 million. It was estimated at that time that flood damages in the amount of about $35 million were protected by this Washington flood-control levee.

Outside of that levee along the Georgetown waterfront completely around to Anacostia, those areas consisting of commercial and residential and other properties are subject to floods which are not otherside controlled and would be susceptible of control by a reservoir at River Bend.

The average annual flood damages thus prevented would be as estimated in the report, $126,000 a year.

We must consider, however, that the rise in the price level since this report was made has been in the ratio of about two and a half times.

Senator MORSE. For the purpose of identification let us state for the record the number of the document.

Mr. BIRRELL. This is House Document 622, 78th Congress, 2d session.

Senator MORSE. Thank you.

Mr. BIRRELL. It has also been determined from our recent surveys resulting from the damages caused by the recent Hurricane Diane that homes now contain many more gadgets, washing machines, deep

freezes, electrical appliances of all kinds; merchants have much greater stocks on hand. In 1942 you will remember that was a war period, with critical shortages so that our surveys indicate that a repetition of those floods would be very much more disastrous than previously estimated.

As a matter of fact, the 1936 flood in the Potomac River Basin produced $12 million of damages in all streams. The 1942 flood due to advance warnings and over protective measures which had been instituted following the 1936 flood, while the flood was approximately of the same intensity in many respects, the damages were limited to $1,442,000. The recent difficulty in the Diane flood which was comparatively of little consequence in the Washington area we found produced over $4 million in the Potomac above Washington.

I think that would cover the extent of such information as I think you desire unless you have further information.

Senator MORSE. How much would the River Bend Dam cost?

Mr. BIRRELL. The River Bend Dam in 1946 was estimated to cost $33 million.

Senator MORSE. What would its life expectancy be?

Mr. BIRRELL. I beg your pardon?

Senator MORSE. What would be its life expectancy?

Mr. BIRRELL. The life of such a structure physically would possibly be as much as a hundred years or more. However, for economic considerations, for amortization of costs, the Corps of Engineers considers 50 years is a useful life.

Senator MORSE. Senator Beall?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. I have no questions to ask you at this particular point.

I have a couple more of Colonel Adams.

Colonel, do the recommendations set forth in House document 622 for the development of the Potomac River and its tributaries still constitute the recommendations of the Army enginers?

Colonel ADAMS. Well, in the first place, the recommendations set forth in House Document 622 for the comprehensive development constituted only the recommendations of the district engineer and the division engineer. The recommendations of the Chief of Engineers are in accordance with the conclusions and recommendations of the Rivers and Harbors Board.

The district engineer recommended the adoption of a project for the beneficial development of the water resources of the Potomac River and its tributaries consisting of 14 dams and reservoirs, transmission lines, and pertinent works at an estimated cost of $235,720,000, to be constructed over a period of about 20 years.

Senator MORSE. At what page are those recommendations?

Colonel ADAMS. I am reading that at page 9 of the document, in the syllabus.

Over a period of about 20 years and the initial project in the comprehensive plan at Riverbend as it had been authorized for construction at an early date was at an estimated cost of $31,700,000.

The district engineer's recommendations were as of 1944, which accounts for the difference between the $31,700,000 and the thirty-three-million-some-odd dollars that Mr. Birrell mentioned a minute ago, which was the result of a rise in prices between 1944 and 1946.

The district engineer also recommended the adoption of a flood-control project at Waynesboro, Va., at an estimated Federal cost of $1,431,000 subject to certain conditions of local cooperation; the modification of the existing flood-control project at Washington, D. C., at an estimated cost of $244,000; the adoption of a project for the completion of the Savage River Dam at an estimated Federal cost of $980,000, subject to certain condition of local cooperation; and abandonment of the existing flood-control projects at Moorefield, Harpers Ferry, and the Arlington Experimental Farm Extension project for Washington, D. C.

The division engineer made the same recommendation.

Senator MORSE. Without objection it will be printed at this point in the record, following the statements just made by Colonel Adams, the material appearing in House Document 622 starting on page 9, the syllabus section, running through to the end of the first paragraph on page 12.

(The document referred to is as follows:)

SURVEY OF POTOMAC RIVER AND TRIBUTARIES, MARYLAND, VIRGINIA, WEST VIRGINIA, AND PENNSYLVANIA

SYLLABUS

"The district engineer finds the following: (*a*) That infrequent floods cause damage throughout the Potomac River Basin and that damage is especially severe to cities and towns along the North Branch, to Waynesboro, Va., on the South River, and to Washington, D. C., on the Potomac River; (*b*) that local flood-protection improvements at Waynesboro, Va., and modifications of the existing flood-control project at Washington, D. C., are warranted; (*c*) that local flood-protection works at other cities and towns throughout the basin are not warranted at this time with the exception of Cumberland, Md., for which a project has previously been authorized; (*d*) that authorized flood-control projects at Moorefield and Harpers Ferry, W. Va., and the Arlington Experimental Farm section of the project at Washington are not justified and should be abandoned; (*e*) that reservoirs for flood control alone are not economically justified; (*f*) that the partially constructed Savage River Dam should be completed; (*g*) that a comprehensive development of the water resources of the Potomac River Basin, consisting of 14 reservoir projects, is justified primarily for water power, but will be beneficial through coordinated operation in alleviating floods, abating pollution, bettering the water supply for Washington, and supplying needed additional recreational facilities; (*h*) that the first project in the orderly development of the comprehensive plan should be the Riverbend project, to be followed by the Chain Bridge and Bear Island projects; (*i*) that the anticipated growth of contiguous market areas will absorb the electrical output from the proposed comprehensive development in the reasonably near future.

"The district engineer recomemnds: (*a*) The adoption of a project for the beneficial development of the water resources of the Potomac River and its tributaries consisting of 14 dams and reservoirs, transmission lines, and appurtenant works at an estimated cost of $235,720,000 to be constructed over a period of about 20 years and that the initial project in the comprehensive plan at Riverbend site be authorized for construction at an early date at an estimated cost of $31,700,000; (*b*) the adoption of a flood-control project at Waynesboro, Va., at an estimated Federal cost of $1,431,000 subject to certain conditions of local cooperation; (*c*) the modification of the existing flood-control project at Washington, D. C., at an estimated cost of $444,000; (*d*) the adoption of a project for the completion of the Savage River Dam at an estimated Federal cost of $980,000 subject to certain conditions of local cooperation; (*e*) abandonment of the existing flood-

control projects at Moorefield and Harpers Ferry, and of the Arlington experimental farm section of the project for Washington, D. C."

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Washington, D. C., April 30, 1944.

Subject: Survey report on Potomac River and its tributaries.

To: The Chief of Engineers, United States Army (through the division engineer, Middle Atlantic Division).

1. *Authority.*—This survey report is submitted in compliance with the following authorizations:

"(*a*) Public Act No. 555, 74th Congress, approved May 5, 1936, which provides: 'The Secretary of War be, and he is hereby, authorized and directed to cause a preliminary examination to be made of the Potomac River and its tributaries, with a view to the control of its floods. * * *'

"(*b*) Public Act No. 738, 74th Congress, approved June 22, 1936, which provides: '* * * SEC. 6. The Secretary of War is hereby authorized and directed to cause preliminary examinations and surveys for flood control at the following-named localities, * * * Potomac River and tributaries. * * *'

"(*c*) Public Act No. 406, 75th Congress, approved August 28, 1937, which provides: '* * * SEC. 5. That section 6 of the Act (Public Act No. 738, 74th Cong.) is hereby amended by adding to the list of localities at which preliminary examinations and surveys are authorized to be made the following names: * * * North Branch of the Potomac River and its tributaries in the vicinity of Keyser, West Virginia. * * *' "

2. A preliminary examination report, covering flood control throughout the entire Potomac River Basin, was submitted in accordance with Public Acts Nos. 555 and 738, 74th Congress, by the district engineer on June 15, 1937, and was forwarded by endorsement on August 2, 1937, by the division engineer, South Atlantic Division. After review of the preliminary examination report by the Board of Engineers for Rivers and Harbors, the Chief of Engineers authorized a survey of the Potomac River and its tributaries on October 1, 1937, requesting:

"* * * that local surveys be made at the following localities: Maryland—Kitzmiller, Luke, Westernport, Bladensburg and vicinity, Hancock, and Williamsport; West Virginia—Piedmont, Keyser, Greenspring, Petersburg, and Paw Paw; Virginia—Waynesboro.

"* * * that the adopted flood-control projects at the following localities be restudied with a view to determining what, if any, modifications therein are desirable: Cumberland, Md., and Ridgeley, W. Va.; Moorefield, W. Va.; Harpers Ferry, W. Va.; and Washington and Anacostia, D. C.

"* * * that further investigations be made of the possibilities of flood control on the North Branch of Potomac River by reservoirs, and of the reservoirs considered in House Document 101, 73d Congress, 1st session, at Great Falls on the Potomac River, at Springfield on the South Branch, at Royal Glen at the forks of the South Branch, at Edes Fort and Capon Bridge on Great Cacapon River, and at Millville and Brocks Gap on the North Fork of Shenandoah River, consideration to be given to developments with and without power."

The preliminary examination and survey at the locality requested in Public Act No. 406, 75th Congress, have been combined with the two previous authorizations and are included in the authorized survey for the entire Potomac River Basin.

3. This survey report has been prepared under the above authorizations and in compliance with instructions from the Office, Chief of Engineers, on October 29, 1942, which stated that:

"* * * a comprehensive report on the beneficial development of the water resources of the Potomac River should be prepared * * *."

4. The Chief of Engineers on December 16, 1937, authorized the submission of an interim flood-control survey report on the Anacostia River, a tributary of the Potomac River, to complete partially the authorization for a survey of the Potomac River and tributaries, as requested in Public Act No. 738, 74th Congress, approved June 22, 1936. The district engineer submitted a report on July 31, 1940, with the recommendation that a project be adopted for protection of Bladensburg, Md., and for that portion of Edmonston, Md., situated on the left bank of the Northeast Branch of the Anacostia River, and that no further consideration be given to the protection of additional areas in the Anacostia Basin. The division engineer, South Atlantic Division, concurred on December

30, 1940. At the request of local interests, the interim report has not yet been submitted by the Chief of Engineers to Congress, pending the completion of investigations by the National Capital Park and Planning Commission for a parkway between Washington and Baltimore, which would affect the proposed improvements.

5. *Scope of survey.*—The present report covers the results of investigations for flood control along the Potomac River and its tributaries, exclusive of the localities along the Anacostia River. Consideration has been given to the economic justification of (*a*) local flood protection works for the municipalities named in the survey directive, except at Bladensburg and vicinity which was covered in the Anacostia interim report; (*b*) modifications of the existing flood-control projects, except at the Cumberland-Ridgeley area for which plans are being prepared under authorization of the adopted project; (*c*) construction of reservoirs for control of floods throughout the basin; and (*d*) the construction of a comprehensive system of reservoirs to develop the benficial water resources of the basin for modification of floods, generation of hydroelectric power, regulation of low-water flows for pollution abatement and water supply, recreation, and other benefits incidental thereto.

6. *Arrangement of report.*—The report is contained in volume 1, which is arranged under the following general headings:

I. General features.
II. The flood problem.
III. Flood control.
IV. Comprehensive reservoir plan for water-control development.
V. Discussion.
VI. Conclusions.
VII. Recommendations.

An appendix[1] is included in volumes II, III, and IV, with general headings as follows:

Volume II:
Section A. Description of reservoir projects.
Section B. Hydrology.
Section C. Flood losses and flood-control benefits.
Section D. Local flood-protection schemes.
Volume III:
Section E. Water power.
Section F. Pollution abatement.
Section G. Geology.
Section H. Soil analyses.
Volume IV:
Section I. Cost estimates—reservoir projects.
Section J. Water supply.
Section K. Recreation.
Section L. Savage River Dam.

Sixty-six drawing,[2] relative to the report, are in a separate folio.

7. *Public agencies.*—A number of Federal, State, and local agencies are active in certain phases of the development of the water esources of the Potomac River Basin and have furnished valuable data for use in the preparation of this report. These agencies include the Federal Power Commission, United States Department of Agriculture, United States Geological Survey, United States Weather Bureau, United States Public Health Service, National Park Service, National Capital Park and Planning Commission, the Upper Potomac River Commission, and the Interstate Commission on the Potomac River Basin.

8. The Upper Potomac River Commission, with headquarters at Cumberland, Md., was formed in 1935 by the State of Maryland. Its jurisdiction is confined to an area along the North Branch of the Potomac River, known as the upper Potomac River district which comprises Allegany County and a portion of Garrett County. The purpose of this commission is to construct and maintain dams and other structures to regulate the flow of water within that district.

9. The Interstate Commission on the Potomac River Basin was organized in 1941 under authority of Congress, which resulted from a compact between the Commonwealths of Virginia and Pennsylvania, the States of Maryland and West Virginia, and the District of Columbia to control stream pollution. Its activities are confined to the Potomac Valley Conservancy District, comprising the entire

[1] Not printed.
[2] Only pls. 1, 16, 18, and 28 are printed.

watershed of the Potomac River. The purpose of this Commission is to furnish to Federal and State authorities information on the status and effects of stream pollution, and to assist in the promulgation of legislation by the interested political bodies for a uniform pollution control program which will conform with plans for the judicious development of the water resources of the basin.

Colonel ADAMS. The Rivers and Harbors Board reported to the Chief of Engineers that local interests were notified of the conclusions and recommendations of the division engineer and were given an opportunity at a public hearing in Washington, D. C., to express their views with respect to the proposed plan of improvement.

Those who spoke and presented information for the record were preponderantly opposed to the plan except for certain local flood-control works and the completion of the Savage River Dam. Residents of the area objected to the construction of reservoirs because they would inundate valuable farmlands, interfere with the transportation systems and disrupt the economic life of the communities.

In view of the objections of local interests to reservoir construction in the basin, the Board is of the opinion that the comprehensive plan of improvement should not be approved at this time. That was in 1946.

But that provision should be made for the protection of Waynesboro, Va., and Washington, D. C., by local flood-protection works, and the Board so recommended to the Chief of Engineers.

The Chief of Engineers at that time in reporting to the Secretary of War stated that after careful consideration he concurred generally in the view of the Board and accordingly recommended the construction of the local flood-protection works at Waynesboro, modification of the existing flood-control project for Washington, D. C., and abandonment of existing flood-control projects for Moorefield, W. Va., and Harpers Ferry, W. Va.

So only the Waynesboro, Va., and Washington, D. C., local flood-control projects went before the Bureau of the Budget or the Congress and only those were recommended by the Chief of Engineers.

I might say at this point further in response to your question that we have altogether 10 open resolutions pertaining to the Potomac River and its tributaries, resolutions of the Public Works Committees of either the House or the Senate and one of those was a House Public Works Committee resolution approved 16th of August 1950. This resolution called on the Rivers and Harbors Board to review the report submitted in House Document 622 and prior parts with a view to determining whether the recommendations for flood control contained therein should be modified in any way at this time.

I believe that we shall be able to work into our investigations program in my district this fiscal year a start or a preliminary review of that report.

The resolution does seem, together with the other nine resolutions pertaining to the Potomac Basin, seems to me to provide ample authority for about any degree of review of previous reports that may be necessary.

Senator MORSE. I have two more questions. In view of the testimony you have just given, would you state what the status of the River Bend Dam proposal is as far as the Army engineers are concerned both at the district level and the level of the Chief of the Army Engineers?

Let me explain my question by saying that what I want the record to show is whether or not the Army engineers at the present time are of the professional opinion that the building of a dam at River Bend is essential for adequate flood-control protection and water supply protection for this area in the years to come?

Colonel ADAMS. As district engineer, I am of the opinion that the construction of such a reservoir is essential for both water supply and flood prevention in the years to come. Now I think I would summarize the status of that proposal in the following terms. We have the report worked up by the Washington District, printed in House Document 622, which contains all of the basic data needed at that time for a study of the report.

And some fieldwork will be required to determine necessary modifications of basic data. A review is required because of changes in costs and changes in the values of benefits and certain other changes that may affect the benefit cost ratio.

There has been changes in the value of power since 1944.

That is the ratio of the value of power to construction costs. And I construe the resolution of the House Public Works Committee of August 1950, as an indication that the committee desires to look into this matter further to determine in its judgment whether or not this project should go forward.

That is the reason we are called upon to make this restudy which we hope we can get some start on during this year.

Senator MORSE. As to the Chief of Army Engineers, is there any documentation in existence that shows his present position on a dam at River Bend?

Colonel ADAMS. The present position of the Chief of Engineers?

Senator MORSE. That's right.

Colonel ADAMS. I know of no documentation that would show his position and I would doubt that he would take a position in other than general terms until he had the benefit of the restudy.

Senator MORSE. I should mark for the purpose of identification in the record as "Exhibit No. 5" the resolution just handed to me by Senator Beall and referred to by the witness.

Senator BEALL. Mr. Chairman, that is a resolution that the Congress adopted in 1950 that I sponsored.

Senator MORSE. Yes; a resolution sponsored by Senator Beall when he was a Member of the House, dated July 27, 1950.

It will be a part of the record.

Senator BEALL. Only showing that 5 years ago we were cognizant with this situation.

(The document referred to is as follows:)

EXHIBIT NO. 5

RESOLUTION

Resolved by the Committee on Public Works of the House of Representatives, United States, That the Department of Agriculture be, and is hereby, requested to review the reports on the Potomac River Drainage Basin, Virginia, West Virginia, Maryland, and Pennsylvania, submitted in House Document Number 269, Seventy-eighth Congress, first session, with a view to determining whether the recommendations contained therein should be modified in any way at this time.

Adopted June 27, 1950.

Attest:

JOSEPH H. MCGANN, *Clerk.*

Requested by Representative J. Glenn Beall.

Senator MORSE. The clerk of the committee has just handed me a speech with which I was not familiar made by Lt. Gen. S. D. Sturgis, Jr., Chief of United States Engineers, made before the Ohio Valley Improvement Association, October 3, 1955, entitled "Water and the Nation's Future," in which there is found on page 7 of this copy the following paragraph. [Reading:]

In connection with stream pollution, which is a part of the overall water-supply problem, I might mention that it is a sad fact, but true, that the beautiful, historic Potomac in the Nation's Capital is so polluted that it has been declared unsafe for swimming in the Washington area. This is not an exceptional case any more; it is becoming typical of streams in heavily populated areas throughout the country.

Are you familiar with the contents of this speech?

Colonel ADAMS. Yes, I am.

Senator MORSE. The clerk suggested that it be made a part of the record and for what value it may prove to have in consideration by the committee, the Chair requests that it be made a part of the record but following the testimony of the witnesses. It will be identified as "Exhibit 6" in the record. Water and the Nation's Future, a speech by Lt. Gen. S. D. Sturgis, Jr.

(The document referred to is as follows:)

EXHIBIT No. 6

REMARKS BY LT. GEN. S. D. STURGIS, JR., CHIEF OF ENGINEERS, UNITED STATES ARMY, BEFORE THE OHIO VALLEY IMPROVEMENT ASSOCIATION, CINCINNATI, OHIO, OCTOBER 3, 1955, ON WATER AND THE NATION'S FUTURE

I was most happy to be able to attend the annual meeting of the Ohio Valley Improvement Association last year when fresh impetus was given its efforts, and it is highly gratifying to note today—a year later—that these efforts are snowballing in both spirit and results.

On the first of next month I, and I am sure many of you, hope to be present at the groundbreaking for New Cumberland lock—an important step in the program for the long-needed modernization of the Ohio River Waterway. I do not need to explain to you gentlemen the details of this program nor the significance of the dedication since you were largely instrumental in bringing about the occasion.

But as Oliver Wendell Holmes said, "It is not where we are that counts, but where we are headed." Hence, as you take understandable satisfaction in the progress of your efforts on behalf of Ohio Valley navigation, it is well to call to mind the many problems still remaining as we survey the current situation of the valley with respect to water resources as a whole. The awful disaster that has just swept New England and adjacent regions has given us another warning—another in a long and tragic series—that water resources must be dealt with comprehensively.

The Ohio River historically has been one of the Nation's great waterways, and the development of the Ohio Valley's great industry and commerce has followed the development of the waterway. The Nation must continue with the development of its vitally important waterways, including the modernization program on the Ohio.

The day after the groundbreaking at New Cumberland, some of us will go to Chicago to break ground on the long-awaited Calumet-Sag Channel, which at long last will effectively link the vast Mississippi Valley waterway system—including of course the Ohio—to the Great Lakes. This same year has seen the initiation of construction on the St. Lawrence seaway, and the closure of Gavins Point Dam, a key structure in regulating the flow of the Missouri River for navigation. Substantial progress has been made on the Warrior-Tombigbee and Missouri River programs; a great project for deepening the Delaware River Channel has been authorized; and work has begun on the closure of the Old River, a project vital to the maintenance of the channel of the lower Mississippi. These are all forward steps in the overall interrelated waterways program.

In all this activity the Ohio has maintained its historic position as one of America's great arteries of commerce, one of the Big Three waterways in the biggest and busiest waterway system in the world. It carries more tonnage than any other American river—half again as much as the second-ranking Gulf Intracoastal Waterway. The Ohio River Waterway has been a great asset to the Nation's security and welfare as well as a wonderful economic investment for the American people.

But, as important as navigation is to the Ohio Valley, its economic well-being is due in significant measure to other water-related factors—particularly to flood control and water supply. Periodically floods have swept down this valley which in a few days wiped out the gains of years. I need not remind you who were here in 1937 that flood control also is an absolute necessity for the economic well-being of this great Ohio Valley.

Recently, as I visited the areas ravaged by the terrible floods in our Northeastern States which followed in the wake of Hurricane Diane, I received a firsthand picture of the latest tragic aftermath of the constant threat to life, industry, and commerce of rivers whose flood-control projects were started in the aftermath of disaster but were then left to languish until another deluge came. That was true in New England and very possibly it is just as true in the Ohio Valley today. In addition to causing the loss of over 200 lives with the attendant great human misery and suffering, the Diane flood in New England also caused physical damage to property far exceeding that of any previous flood in the history of our Nation. During each of the several visits I have made to the Northeast area since this catastrophe, I have been forcibly struck with the immensity of the human dislocation and the economic impact upon the region.

In addition to the tragedy of human suffering and loss of life it must be remembered that virtually none of the flood damages incurred were insurable. So today, as is inevitable after every disastrous flood, there is much talk of flood insurance. If such a thing as flood insurance ever becomes feasble, it would make me happy indeed to know that some measure of monetary reimbursement for losses suffered by unprotected residents could be made after the damages are suffered. But even though flood insurance is proved to be economically feasible, it cannot replace lives, nor can it pay for human wretchedness. Not many people would exchange their homes or businesses or jobs for silt, slime, wreckage, and despair even though paid for it. Hence, I should tell you frankly that I consider the best possible flood insurance our Nation's residents could have is an adequate flood-control program of projects—completed and in operation—for preventing the damage before it occurs.

A good start was once made on the flood-control program for the Ohio Valley. I was here in those bustling days. The present program calls for 77 reservoirs, of which 33 have been built and 3 more are under construction; and 134 local protection projects, of which 43 have been completed and 11 more are under way. Despite the short time they have been in existence—an average of 8 years—the works already built have prevented about $440 million in damages, as against their total first cost of $500 million.

Yet we face the fact that the authorized Ohio Basin flood-control program as a whole is dollarwise less than a third complete, that the valley is still far from adequately protected, and that the going seems to be getting progressively tougher.

The valley is booming industrially and the increased value each year of this expanding economy increases the need for flood protection; at the same time it increases the problems and costs of acquiring land for reservoirs and for highway and railroad relocations.

This is not the first time that we of the corps have had to invite public attention to disagreeable facts. In February 1951 I considered it my duty to voice some of them at a meeting of the Missouri Basin Inter-Agency Committee. Here is what I said:

"I believe it is dangerous for the people of the basin to permit the flood control and development program to lag to long. There is every reason to believe that nature will continue to act as she has in the past with respect to disastrous floods on the Missouri and its middle tributaries. It may be a year or it may be 25 years but disaster will surely strike."

Within 5 months came the great Kansas River deluge in 1951; and a year after that came the greatest flood in the history of the Missouri.

Again, in July 1955, Brig. Gen. Robert J. Fleming, Jr., our New England Division Engineer, at a meeting of the Connecticut Valley Flood Control Com-

mission and the assembled mayors of the cities of the Connecticut Valley, gave full warning of the hazards attending an incompleted program. He said that just as sure as he was standing there, there would be another major flood in Connecticut. Six short weeks later his words were made true in terrible fashion.

No region is alone in this danger. In the entire United States, no major river-basin program is more than two-thirds complete; in fact, only one—the parent project on the lower Mississippi—is more than half complete. Of the $9 billion worth of the so-called active projects—necessary and financially justified flood-control projects authorized by Congress—only $3.6 billion worth, or a little over one-third, have yet been built. Either the memory of man is very short or he has an abiding faith that the good Lord is only going to use one-third size floods in the future compared to those of the past.

However, I hope you will not regard me as an alarmist. Rather, I would remind you that the Department of the Army, through its Corps of Engineers, has a grave responsibility imposed upon it by the Congress on flood-control matters. As Chief of Engineers, I would be negligent in my duty if I did not point out the inadequacies of progress made to date in protecting this great valley from the deluges it will most surely receive in the future. These lagging flood-control programs must be accelerated locally, regionally, and nationally.

And now I should like to turn to another but interrelated facet of your valley's and the Nation's growing water-resources problems—that of water supply. For, although it is true that navigation has contributed greatly to the economy of your valley, and flood control is necessary to safeguard it, it is also true that an assured, adequate supply of water for domestic and industrial use is absolutely necessary if the valley's economy is to be sustained and further expanded.

Some relief has already been afforded through Corps of Engineers projects. For example, during the drought of 2 years ago flood-control reservoirs on the upper tributaries of the Ohio provided flows in the Ohio and Mississippi for the corollary needs of domestic and industrial water supply and for navigation. Similarly, 2 reservoirs on the Missouri alone provided 75 percent of the flow at Omaha and about a third of the total flow of the Mississippi at St. Louis. In fact, in the fall of 1953 Army engineer reservoirs provided 75 to 90 percent of the flow in various reaches of the entire Mississippi River system.

These facts all point up the interrelationship of all water resources problems and emphasize the necessity for coordinated, comprehensive water resources planning. They also emphasize the necessity, in the Ohio River Basin and elsewhere, for specifically considering in all future studies the recent but critical problem of water supply.

Today the Nation's population is growing at the unprecedented rate of over 2 million persons a year, and each person keeps using more and more water. The needs of industry are soaring as new processes and products require constantly more water. Today industry uses 8 times as much water as it did in 1900, and it is estimated that by 1975 it will use 2½ times as much as it does now. In fact, the Nation's withdrawals of water for industry now about equal withdrawals for irrigation, and irrigation in the humid East is now growing faster than in the arid West. Meanwhile, the ever-rising standard of living calls for constant increases in water use for sanitation, air-conditioning, recreation, pollution abatement, and scores of other purposes.

In connection with stream pollution, which is a part of the overall water-supply problem, I might mention that it is a sad fact, but true, that the beautiful, historic Potomac in the Nation's Capital is so polluted that it has been declared unsafe for swimming in the Washington area. This is not an exceptional case any more; it is becoming typical of streams in heavily populated areas throughout the country.

During recent years the center of population has moved westward and southward, and significantly, I think, in proportion to the development of water supply in industrially expanding centers of population, such as Fort Worth, Houston, and many other southern and western cities. I am told that about 20 years ago an eastern firm desired to locate a plant in Houston—a plant which would require about 20 million gallons of water a day. City officials were obliged to tell the firm that that was more water than the entire city of Houston was then using. Today, after a tremendous enlargement of the city's water supply facilities, it is accommodating plants using as much as 60 million gallons a day. In the past 20 years Houston has expanded industrially in proportion to its ability to assure an adequate supply of water for industrial and other purposes; and I am sure that the main concern of its citizens today with respect to the con-

tinued growth of the city is its ability to solve the problem of developing an assured supply of water for meeting anticipated future needs.

The fact is that water supply like navigation and flood control, is a vital necessity to the economy of a locality, region, or nation.

Until recent years, water for industrial use was taken for granted in most parts of the country. If you couldn't get it out of a nearby stream, you could always dig a well and let it flow out or pump it from a short distance below the surface.

However, the use of ground water alone tripled between 1935 and 1950, and certain important areas are in danger of mining out their centuries-old accumulations of it. On the high plains of Texas ground water is being withdrawn at 30 times the rate of replenishment. In California, salt water is moving inland through the aquifers at the rate of 300 feet a year, because the fresh ground water, which once stood within 20 feet of the surface, has now sunk to hundreds and even thousands of feet down. In the Chicago area, where artesian wells once gushed, wells must now be sunk as much as 500 feet in some cases to reach water. Salt-water intrusion is being felt along the Atlantic and gulf coasts. Water tables have been persistently lowering in nearly all populous areas of the country.

It was during the Second World War that the Nation began to wake up to the fact that it had a national water-supply problem. The President's Materials Policy Commission tells us that plans to build at least 300 industrial or military establishments during the war had to be abandoned or modified because of an inadequate water supply. Another example more recently of the critical nature of the problem: During the first 8 months of 1953, over 1,000 cities and towns all over the Nation reported curtailment of water use.

As I have said, it is estimated that industrial demands for water will more than double within the next 20 years. The use of water within the family household is also constantly going up. The net effect is an exponential increase in the Nation's per capita consumption of water.

The Nation's water supply problem is a most serious problem. In fact, I believe that this constantly growing, inexorable nationwide demand for more and more water in the face of a constantly diminishing natural underground supply has now reached such proportions that the most critical single future water resources problem facing the Nation is that of providing an assured adequate supply of water for future domestic, industrial, and other needs.

Can we look to underground supplies for the solution to the problem? The answer is "No." In those communities now dependent upon underground sources for their water supply, the rate of demand has already exceeded the rate of replenishment generally, so that the nationwide effect of a greater per capita consumption for the Nation's growing population will be a continued further depletion of these underground sources. In some areas of the country the physical limits of further underground development have been reached already, thus precluding further growth of the communities in them unless an adequate supply of water can be provided by other means.

The Ohio Valley is by no means exempt. As yet I know of no one who has measured the cost of water supply problems to this great valley, but you and I know there have been instances of important industries that have been unwilling to locate in certain areas or have been unable to expand in others only because of a lack of an assured adequate water supply.

The Federal Government is already rendering important cooperative services in the field of water supply. For example, 15 reservoirs constructed by the Corps of Engineers are now providing well over a million acre-feet of municipal water supply storage to communities all the way from Ohio to Texas. Right here in the Ohio Valley, as you know, some of the reservoirs constructed by the corps are being operated in such a way as greatly to mitigate the pollution and temperature problems of various industries. Examples of such kinds are to be found all over the country. However, the water-supply services they now render are primarily to existing interests for existing needs. Our projects generally do not provide for future water supply needs for future customers—domestic, commercial, agricultural, and industrial. Furthermore, under present legislation, those services that are rendered are incidental aspects of some other primary objective or objectives of the projects.

The time has already come, in my opinion, when no storage reservoir should be built by any agency, whether it be by Federal, State, or local government or private industry, without appropriate provision for the inclusion of storage for water-supply purposes. This would mean that those agencies of Government

dealing with water-resources development should have appropriate authority to include water supply as a specific function in the planning, construction, and operation of their projects.

The matter of planning, and financing, would not be simple. For one thing, the primary responsibility for the financing of water-supply facilities lies properly, I believe, with the local communities and States involved. And local and State laws vary to an amazing extent. Not only the laws, but the problems and circumstances, vary almost infinitely as we pass from the humid East, with its basically riparian approach to water, into the arid West and the intricacies of appropriation law. The problems of funding, of water right, of Federal and non-Federal participation, of cost allocation, and of cost reimbursement, in water-supply projects promise to at least equal those encountered in any other branch of water-resource development.

Current practice is to design water-supply functions into federally constructed reservoirs only to the extent that interests already in existence are willing to contract for reimbursement of the allocated costs before the reservoir is built. It is almost axiomatic that an additional supply of water will be needed in almost any given area within a reasonably short time; and this future need is something that should be planned for. However, how many agencies are there now financially able and willing to contract now to pay for storage capacity for needs which are to occur in the future? In my judgment the current approach must be modified to permit a fuller measure of development of potential storage for future requirements.

It seems to me self-evident that an adequate water supply for the future will have to depend more and more upon the conservation of surface water through the use of manmade reservoirs constructed by the Federal Government, other governmental agencies, and private concerns. I believe that, just as the reservoirs now existing in the Ohio Valley have played an important, though incidental, part in maintaining the supply of water in the river and its tributaries, so the reservoirs of the future should—not incidentally, but through deliberate, scientific plan and design—play increasing roles in maintaining water supplies for the future.

I firmly believe that in the interest of health, security, and welfare of the Nation the time has come for consideration of enactment of Federal legislation, including an appropriate "declaration of policy" such as was embodied in the Flood Control Act of 1936, for cooperating with the State and local governments and other agencies, both public and private, in the solution of this vital problem of an assured adequate future supply of water for domestic, industrial, and other purposes.

Any action looking toward legislation might very well include consideration of (*a*) legislative authorization for specific consideration of the water-supply problem in all future water-resources investigations directed by the Congress, and (*b*) delineating specific procedures for cooperation by the Federal Government with the States, local governments, and private agencies concerned with the development of water-supply facilities in federally constructed projects.

As I have indicated, I am convinced that something must be done to close the water-supply gap in our present Federal laws and programs, and to facilitate an overall, sustained, unified effort for solving the Nation's water problems on a comprehensive and coordinated basis. The Nation can no longer tolerate piecemeal, inadequate water-resources planning. Its water problems are too critical, and exist on too many fronts. They must be met on all fronts at once with integrated, comprehensive programs for development.

So, in recapitulation, I would like to say that it is my sincere and earnest conviction that the Nation can no longer afford to procrastinate in dealing with its water-resources problems, but it must now squarely face the fact that its overall program of water-resources development must be revitalized, accelerated, and expanded if the future security and economic well-being of the country are not to be placed in jeopardy. This expanded water-resources program must provide not only for the traditional and longstanding needs of navigation and flood control, but must provide a solution to the Nation's most recent, but most rapidly growing and most critical of all future water-resources problems—that of an assured, adequate supply of water for future domestic, industrial, and other needs.

I submit to you that all groups interested in water must unselfishly cooperate, must employ all their great resources of know-how, must devote all their proven leadership, in bringing about the means of satisfying the Nation's constantly growing needs not for just this or that water-related advantage, but for all its

water needs on a realistic integrated basis. Not as shippers or constructors or operators, but as American citizens, we have this most critical responsibility and duty to perform, so that we may not risk the birthright of future generations for a mess of pottage, but instead may hand down to them the heritage of a Nation that is adequately developed for security and prosperous living.

Senator MORSE. I have one other question, Colonel. Do you have any opinion as to any site that you think would be suitable for this plant that would be economically feasible and feasible from an engineering standpoint?

Colonel ADAMS. I do not believe that I can state that I would have a very well-considered opinion. I do not claim to be well versed in the requirements of a site for the construction of a steam plant. I am of the opinion that there are several areas above the levels that would be inundated or the flood levels above the reservoir that appear to me that they should be usable as sites for such an installation.

But I have concerned myself only with getting above the inundated areas and have not gone any further into looking into specific locations.

Senator MORSE. As the district engineer, you have during your time of service in this area familiarized yourself with many of the problems of the river and problems of flood conditions and streamflow, have you not?

Colonel ADAMS. Yes; I have.

Senator MORSE. Would you say that one would be justified in drawing the conclusion that Pepco is not necessarily limited to this site? There are other sites that would serve its purpose consonant with the Army engineers program for flood control and water-supply protection.

Colonel ADAMS. Yes; I would say that is a valid conclusion.

Senator MORSE. That is all.

Did any of your other witnesses wish to make any further testimony before we proceed?

Representative SMITH. May I ask 1 or 2 questions?

Senator MORSE. You certainly may.

Representative SMITH. Colonel, I have noted your presentation relative to the danger to future industrial development in that area if Pepco goes there. It is a fact, which you may or may not be familiar with, that Loudoun County, on the south bank of the Potomac, runs from the site of this proposed plant to Harpers Ferry. Are you familiar with the fact that all of that territory with the exception of this one spot is opened as residential?

Colonel ADAMS. I was not familiar with that fact. I knew this immediate area was. I did not know the situation on up.

Representative SMITH. I am told by people from Loudoun County that that is so.

Colonel, I don't remember whether you were here in 1946.

Colonel ADAMS. I was not here then.

Representative SMITH. I was. We had quite a row about this very thing you are talking about. There was a large public hearing held, which lasted a day. At that public hearing the local protests, not only at this location but in all those other locations of the river, were so tremendous and so overwhelming that the thing just blew up in a frenzy of opposition and as a result of that there is the statement

which appears in your Document 622, that the Chief of Engineers did not recommend this thing.

Colonel ADAMS. That's right.

Representative SMITH. So that has never been recommended by the Chief of Engineers?

Colonel ADAMS. That is the point I was attempting to make a while ago. It was only the district and division engineers that recommended it but not the Chief of Engineers.

Representative SMITH. I believe you so stated.

As to this thing of stopping the clock of progress, whenever the Army engineers consider that at some time in the future they might build a dam, the same discussion that you have given us on the Potomac would apply to most any other river on which you are considering building at some future date a dam?

Colonel ADAMS. If the conditions were pretty much the same or generally comparable, I should think yes.

Representative SMITH. In view of it, of the very uncertain question about this dam at all and the fact that after most elaborate hearing and report that the Chief of Engineers has recommended adversely, do you think the position of the Army engineers should be that that property must stay in status quo indefinitely and no development must occur up there because it might cost some more to build a dam at some future time than in the distant future?

Colonel ADAMS. There are several points I would like to make in that connection. I would not say that the Chief of Engineers recommended adversely. He picked only a small part of the project to recommend favorably on and concurred in the findings of the Board of Rivers and Harbors which concluded that the project should not be recommended at that time.

Representative SMITH. Yes.

Colonel ADAMS. At that time, of course, the need for water storage for the water supply of the District of Columbia is not foreseen as it is foreseen now. In answer to your question in general, I think the answer must depend a great deal upon the alternate choices that may be open to the industries, such as Pepco, who are part of the wheels of progress. And I think if they do have the alternative of locating in places where they will not obstruct future development, that they should so locate. If you got into a problem where there was only one place for them to go and they were in the way of some other desirable feature, I would not want to try to venture an offhand answer to such a problem.

You would certainly be in a dilemma.

Representative SMITH. That is all, thank you, Senator.

Senator BEALL. No questions.

Senator MORSE. I want to thank you very much. We may recall you men to the stand later if we need more information to be elicited from you. I am not given to idle compliment, Colonel, but I want to say that the presentation of your case I think was remarkably clear and succinct and exceedingly able and I compliment you on it.

Colonel ADAMS. Thank you very much.

Senator BEALL. It is customary of Colonel Adams, Mr. Chairman.

Colonel ADAMS. Thank you, Senator.

Senator BEALL. Mr. Chairman?

Senator MORSE. Senator Beall has a witness he would like to call at this time.

Senator BEALL. I would like to call Mr. William Cary of the District Health Department.

Senator MORSE. Will you identify yourself for the record, Mr. Cary, as to your title?

STATEMENT OF WILLIAM H. CARY, JR., ASSISTANT CHIEF OF THE BUREAU OF FOOD AND PUBLIC HEALTH ENGINEERING OF THE DISTRICT OF COLUMBIA HEALTH DEPARTMENT

Senator MORSE. Do you have any statement you wish to make on the subject of this hearing?

Mr. CARY. Senator, I have not a prepared statement but with reference to the things that have been said I would like to correct 1 or 2 errors for the record.

Senator MORSE. You may proceed with your explanation of what you consider to be errors.

Mr. CARY. Colonel Adams inadvertently said that the water samplings that were collected outside of those that were collected by the Washington aqueduct were collected by the Department of Sanitary Engineering. That is a function of the District of Columbia Department of Public Health and is under my supervision.

I would like to second all the things that the colonel said with reference to the matter of public health and the effects of the location of or possible location of this plant on our water supply but I would like to broaden the concepts of public health. I don't believe that public health represents the control merely of cases of contagious disease, that may be carried by pathogenic bacteria.

I think the public health is affected by the potability of the water. If the water is warmer, people won't like it to drink so well. If it contains taste and odors, then it generally loses its acceptance as a public supply. Under those conditions people are tempted to buy bottled waters over which we have far less control, can exercise far less supervision than we can over the public supply and about which we know that the chances of getting a source that is not satisfactory are constantly greater due to the fact that they are handled many times in small quantities.

So that it would be my considered opinion that the water supply would be adversely affected by the installation of this plant from the standpoint of public health.

Not that it would increase the number of specific diseases, such as I mentioned, typhoid fever, but just that they would probably render the water less acceptable.

We already have taste and odor problems in our public supply. The number of complaints that reach my office and I am sure that reach Colonel Adams' office and Mr. Auld's office show that people are aware of these conditions. We have modified our methods of treatment in the last 10 years considerably to meet that very problem.

The process of chlorination of the public water supply has been changed by the Washington aqueduct from one embodying chloromine, the use of ammonia in connection with chlorine for stabilization of product to a superchlorination where we put in sufficient amounts of chlorine to burn out those substances and get a free residual chlorine in the water that are free from the tastes and odors that were connected with the chloromine products.

That has resulted in cleaning up the main so we don't get the aftergrowths. We previously had a large percentage of the samplings during warm water showed aftergrowths in the mains. We have been able to bring those under control. If we raise the temperature of the water a few degrees even in the mains we may generally have to do things in the water supply to again control such aftergrowths because they are fostered by increases in temperature, some of our tastes and odors problems are caused by the very plants, blue-green algae that would be enhanced, whose life cycle would be enhanced by the addition of temperature to the water.

If for instance, we add temperature to the water we make the living conditions in the water better for those plants. We have to assume that everything else or at least one of the other necessary factors would be entirely eliminated, such as food supply. We know there is sufficient food supply in there to support a blue-green algae growth in the river now. If we increase the temperature, I feel personally that we might be increasing the opportunity considerably for those algae to multiply beyond the present numbers.

Certainly by increasing the length of season making it earlier in the spring and later in the fall during which they could grow we would increase the numbers that would be there and the tastes and odors problems.

And we might considerably increase the cost of water to the consumer by having to increase the costs of treatment in order to compensate for those factors.

And that is about the extent of my interest in the matter.

Senator MORSE. Senator Beall.

Senator BEALL. One question. You listened to the testimony of Colonel Adams and his associates this morning.

Mr. CARY. With considerable interest, sir.

Senator BEALL. In your official capacity would you be concerned about the furtherance of industrialization on this stretch of the river over and above the construction of the Pepco plant?

Mr. CARY. I would be greatly concerned. I am somewhat concerned about what you might call the captive industries that would be within that plant itself. Of necessity they must have to carry on some shop practices, repair practices, and things like that, that would all result in even a small amount of industrial waste from that area.

There certainly would be some sanitary sewage created by the employees that were there. Even that small amount of waste at that point with the heat would be added problems to our water supply, I'm sure.

Senator MORSE. That's all. Thank you very much.

The next witness will be Mr. Dunn, president of Potomac Electric Power Co.; Dr. Sheppard T. Powell; and Dr. Ruth Patrick.

STATEMENT OF R. ROY DUNN, PRESIDENT, POTOMAC ELECTRIC POWER CO., ACCOMPANIED BY GEORGE BISSET, SENIOR VICE PRESIDENT; L. C. CADWALLADER, MECHANICAL ENGINEER; DR. RUTH PATRICK, LIMNOLOGIST; SHEPPARD T. POWELL, CONSULTING ENGINEER; AND JAMES FRANCIS REILLY, COUNSEL, POTOMAC ELECTRIC POWER CO.

Mr. DUNN. I am R. Roy Dunn, president of the Potomac Electric Power Co.

Senator MORSE. We are happy to have you here.

Mr. DUNN. I am happy to be here and I am glad this hearing is called today so that it will clear up these problems.

Senator MORSE. You proceed in your own way. When you finish, present your witnesses in the order which you would like to present them. When you are finished with your testimony the committee will ask whatever questions they care to.

Mr. DUNN. I would like to make this statement. To begin with, we are deeply interested in water supply and the pollution-abatement problem of the Potomac River. We have listened to the experts, Dr. Renn and Mr. Favor, that were brought in by Colonel Adams. I think Colonel Adams has been very frank about this entire problem and I want to compliment him for that. We have no prepared statement to make except that we have Dr. Ruth Patrick, from Philadelphia, who is an authority on water and water supply and the various elements that go into this, and we have Mr. Sheppard Powell, who is a consulting engineer from Baltimore.

We have their qualifications and I would like to put those in the record.

I wold like to ask Mr. Powell if he has any statement to make with respect to the testimony of Dr. Renn and Mr. Favor. I believe in substance we are in agreement with those experts.

Senator MORSE. Before we call on Dr. Patrick and Mr. Powell, we will insert at this point in the record a statement of the professional qualifications as submitted by Mr. Dunn.

(The documents referred to are as follows:)

DR. RUTH PATRICK

Ruth Patrick, B. S., M. S., Ph. D., curator limnology, Academy of Natural Sciences, Philadelphia, Pa. Member of the faculty of the University of Pennsylvania. Member of the faculty of Marine Biological Laboratory, Woods Hole, Mass.

Education: Undergraduate, University of Kansas and Coker College; graduate work, University of Virginia, University of Pennsylvania, Marine Laboratory, Woods Hole, Mass.

Limnological consultant for many industries, State governments, and Atomic Energy. Chairman of committee on the ecological effects of water of the American Limnological Society; official United States delegate to International Limnological Congress in 1954, and many others.

Trustee of Coker College; trustee of Pennsylvania School of Horticulture.

Societies: Fellow American Association for Advancement of Science; Sigma Xi; American Psychological Society; International Limnological Society; American Commission.

Department consists of 25 members of which 15 are specialists in a particular field of limnology.

Recipient of grants from American Philosophical Society; National Science Foundation; United States Public Health; United States Navy; Manufacturing

Chemists Association; and American Petroleum Institute Catherwood Foundation, etc.

Past president of the Psychological Society of America; Limnological Society.

Publications: About 50 scientific articles in the fields of algae and limnology. At present, writing a book, A Treatise on the Fresh Water Diatomi of U. S. A.

SHEPPARD T. POWELL, BALTIMORE, MD., CONSULTING ENGINEER

Mr. Powell received his technical education at the Rensselaer Polytechnic Institute, specializing in water conditioning, sewage and industrial waste treatment.

For many years he was associate in sanitary engineering, Graduate School of Hygiene, Johns Hopkins University. He is the author of many papers and textbooks on water conditioning and allied problems. For many years he has maintained an extensive worldwide engineering practice, including consulting services to Federal, State, and municipal groups, and many State and Federal agencies, including the Tennessee Valley Authority. He is an adviser to the Secretary of the Interior on the saline water conversion program. He has given expert testimony in many important legal cases and served as the expert for the State of New Jersey in the 1930 and 1954 Delaware River diversion case. He has received numerous honors from various technical societies in recognition of engineering achievement.

He is a life and honorary member of the American Water Works Association, fellow and honorary member of the American Society of Mechanical Engineers, fellow of the American Public Health Association, member of the American Chemical Society, and many other technical organizations.

Mr. POWELL. I have no prepared statement because I did not think a statement would be required at this time.

I have, however, as I have listened to Dr. Renn's statement, which had the privilege of reviewing beforehand, there are certain points I would like to discuss very briefly because I think by such a discussion it may tend to clarify some of the situations.

I will take these up in the order in which I have jotted them down.

I will speak about them very briefly. There is a point on page 2 where there has been discussed the 14° temperature rise and if I heard correctly that 14° temperature rise was spoken of as an elevation of temperature of the third of the way down.

Actually that 14° is right at the discharge from the condenser and as soon as the water from the condenser, the temperature of which has been elevated, is mixed with the water, there is, of course, a reduction in that temperature and actually as soon as that has been mixed with the water the temperature will be an average of about 7° and when the river flows with this water in it, which initially entered at 14° reaches Seneca Falls it is of a magnitude of 3° to 4°.

Senator MORSE. What obstacles, if any, would there be to mixture of the hot and cold water at this point?

Mr. POWELL. There would be no obstacle at all if the outfall was so designed that they could assure admixtures, which is frequently done in powerplants. Have I answered the question?

Senator MORSE. Yes.

Mr. POWELL. I would like to point out, too, that the temperature we are talking about here and the temperature not only at this point but the temperature at intake at Washington is for a relatively short period of time. That period of time is only during streamflows of the river and it is of the magnitude of a few days in a month.

(See appendix for memorandum from Colonel Adams in re low stream flows.)

Mr. POWELL. I think the figure was given, but this can be corrected by Mr. Favor, of 24 hours in 1 year.

So the temperature rise and its effect on quality of water would be at the most for a very short period of time, a question of a few hours over an interval when these streamflows were occurring. When the flows were high or above stream low then that temperature rise would be very small, if any.

Dr. Renn has spoken about the detrimental effects of chlorinated phenols. He is entirely correct in that with those combinations, when the water supply is chlorinated, it produces a new compound that has a distinct odor and disagreeable taste. That has occured in many water supplies. Dr. Renn pointed out if any of that was created either by this plant or by the waste from industrial plants then it would create a very severe condition in Washington.

Dr. Renn stated also that he was not fearful, but brought out the point that it, the water from this plant, at times would contain excess chlorine, which if phenols were present would make a taste and odor. I would like to point out that first of all this plant will not create phenols, because the only source of the phenols they could get would be from the coal pile or material put on the coal pile to prevent washing. That is certain types of oils. These will not be used in this plant. So I believe there will be no source of phenol whatever in this plant.

If chlorine, if phenols were in the plant and chlorine were in the circulating water leaving the plant which at intervals it would contain a small amount and chlorinated phenols were thus produced, that would be exactly the same condition as if that plant were not there and the chlorine added to the city water when combined with any phenols which might be in the water from other sources would also have a chlorinated phenol taste and I believe that it might be worse at that point than it would if the chlorine, or chlorination actually took place from this plant at which of course there would be no phenol.

Senator MORSE. Senator Beall has a question.

Senator BEALL. You said that there would not be any treatment of the coal for burning. Isn't it customary in the modern way now for burning coal, particularly for high heat, to treat the coal? Isn't that customary now?

Mr. POWELL. That question would have to be answered by the operators.

Senator BEALL. I just wanted the record to show if you knew that was not or is customary. Isn't the modern way to treat coal with oils to keep down the smoke and the other objectionable features of it?

Coal is often treated before it is burned.

Mr. POWELL. Some plants may put additives on the coal for other reasons. The point Dr. Renn made out was the material that would be sprayed on the coal pile which might contain phenols which might be washed into the river. None of these products will be used on this coal pile.

Mr. REILLY. I suggest, Senator, maybe Mr. Cadwallader might answer the question for the purpose of articulation that Senator Beall is talking about.

Mr. CADWALLADER. We do not buy coals that are oil-treated. It costs additional money to purchase that kind of coal. It has no

significance to us except to reduce a dusting problem. We lay out our coal-handling systems with dust collectors so that we handle any dusting problem in our equipment internally within the plant and not by purchasing oil-treated coal.

Senator BEALL. You buy run-of-mine coal?

Mr. CADWALLADER. That is correct. And slack coal. No treatment whatever.

Mr. POWELL. Dr. Renn has pointed out also that in the treatment of the water for boilers a system known as demineralization may be used and if it is used in this type of treated plants, there is sulfuric acid and caustic soda; however, these wastes created at powerplants are never discharged in the river directly. They are collected, they are treated and, well, when they are discharged into the river, they are not noxious. And many plants throughout the United States are being so operated today.

Dr. Renn also raised the question of the potential increase in hardness which might result from picking up hardness or calcium and magnesium salts from a fly ash which will be created by the burning of the coal.

He has calculated what that would be and at minimum flows then it will not be more than a half part per mile and his figures and mine check almost identically on this point, we are quite in agreement. But the amount that could be created, the total potential amount of hardness that could be created would be of very small magnitude and hardly within the tolerance for the test for hardness.

I think that is the only statement I would like to make. I would like to make one further remark that we are quite in agreement with the general findings of Dr. Renn on the quality of the water.

Senator MORSE. Thank you. Senator, any questions?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. Dr. Patrick?

Dr. PATRICK. I would like to make a few comments about these tastes and odor problems, Mr. Senator. I have been working with algae for some 25 years and recently through various grants from foundations and industry we have made an intensive study on the effect of temperature on aquatic life because it is a problem that I think we all recognize.

I am in full agreement with Dr. Renn in his statement that under the present conditions, the addition of what little temperature there will be to this water will not cause the production of obnoxious algae that will produce taste and odor problems. To back that up I have here a little graph which is a result of experiments which we have done which shows that in normal streams your diatomes dominate your population from 20 to 25° and then start to come down.

Your greens come up and dominate to 35 and your bluegreens take over between 35 and 40. I will convert this for those who don't realize the centigrades to fahrenheit temperatures.

Senator MORSE. Doctor, is the graph in such form so it can go into the record?

Dr. PATRICK. Yes; you can have it for the record if you wish it.

Senator MORSE. Then let me see if I can identify it. It will be marked as exhibit 7 for the record and the graph is supplied by Dr. Patrick entitled "Shifts in Dominants of Types of Algae," said graph explained by the doctor's testimony. Is that identification adequate?

Dr. PATRICK. Yes.

(The document referred to is as follows:)

EXHIBIT No. 7

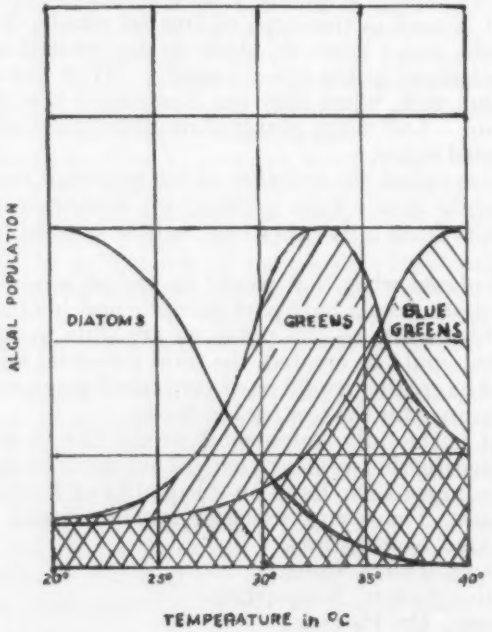


FIGURE 3 POPULATION SHIFTS WITH TEMPERATURE

Shift in dominants of algae when temperature is the only condition altered

Dr. PATRICK. Would you like me to convert those temperatures into Fahrenheit for people's general understanding?

Senator MORSE. Let me assure you that not only the people need the clarification but the chairman needs the clarification.

Dr. PATRICK. Then let us say that the diatones would generally dominate an ordinary river which was not polluted by organic wastes of various types at temperatures of 77°, 78°.

That between the temperatures of 86° and 95°, you would get your green algae taking over and your blue greens coming in.

But the blue greens would not become the dominant part of the population until temperatures between 95 and over 100. That would be the temperatures in which you would get this serious blue green.

This is a case, if you do not have enrichment by organic matter such as these industries upstream we were talking about. This is in full agreement with Dr. Renn's statement earlier this morning. Now, about these upstream industries, if you have industries coming in that are going to produce organic waste, that are going to add to those kinds of minerals that are nutrition to algae, you are going to have

this happening. I would like to point out that if you erect dams in this river which will produce lake-like conditions, that you are bound to have taste and odor problems or at least this has been usually the experience with waters carrying heavy loads of these types of minerals.

For this reason I feel that Washington should look at these industries or the kinds of industries they are going to allow on the Potomac whether or not the powerplant is erected, if they are going to dam the river.

Senator MORSE. Senator, do you have a question?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. Thank you very much.

Mr. DUNN. It is very important to us to nail down this temperature situation because that is having an effect on the use of the upper Potomac River for a powerplant site, in the development of a powerplant.

I think from the testimony by the speakers, by the experts here that there is absolutely no problem in connection with temperature and the effect of temperature upon the water.

So I would like to have that nailed down and put that one to bed.

Senator MORSE. You will put it to bed but it is the job of the committee to take care of the patient.

Mr. DUNN. It seems to me the temperature thing and the effects on the quality of the water have been pretty well taken care of by these experts.

Being a public utility we are very much interested in the community and the community life and we are not going to do a thing that is going to affect the quality of the water for the District of Columbia or any other community in our service area.

As science and engineering can solve a great many problems and I think that by proper controls and proper engineering, the fears that certain people along the lines of water tastes and things like that will completely disappear because we will do everything we can to handle those problems in the design and in the construction and in the operation of any plants that we build on the upper Potomac River.

Now, the next thing that came up following the same order that Colonel Adams took was the industrialization of the upper Potomac River and I would like our counsel, Mr. Reilly, to make a statement with respect to our obligations under the purchase contract of this land.

Mr. REILLY. I know from experience that the Senator from Oregon deals in facts and not in newspaper articles. I would like to read the section of the contract between the vendor and the vendee on this question of cooperation, and so forth, for the expansion of the industrialization and we will make copies of this contract available to the committee if they desire them.

Senator MORSE. Let me identify it now as exhibit 8 in the record. It will be marked for the purpose of identification as exhibit 8. The contract entered into between——

Mr. REILLY. The Triple Seven Stock Farm, a partnership, and Potomac Electric Power Co. and recorded in book 348, page 200, of the circuit court, Loudoun County, Va.

Senator MORSE. So identified and incorporated in the record at this point.

(The document referred to is as follows:)

EXHIBIT No. 8

THIS AGREEMENT, made in triplicate this 3d day of August 1955, by and between TRIPLE SEVEN STOCK FARM, a partnership, party of the first part (the "Vendor"), and POTOMAC ELECTRIC POWER COMPANY, a District of Columbia and Virginia corporation, party of the second part (the "Vendee"),

Witnesseth that

1. Subject to the terms and conditions hereinafter set forth, the Vendor hereby agrees to sell and convey to the Vendee, and the Vendee hereby agrees to purchase, the following described parcel of real property with improvements thereon, if any (the "Property"), situate and lying in the Broad Run District, Loudoun County, Commonwealth of Virginia:

"All those pieces or parcels of land aggregating 519 acres, more or less, as described by metes and bounds in a certain deed dated April 7, 1955, made by Agnes Dale Crosby to Triple Seven Stock Farm, which deed was recorded on April 8, 1955, in Deed Book No. 344, Page 208, of the Land Records of said Loudoun County; provided, however, that the westerly boundary of said 519 acres shall be, notwithstanding anything to the contrary contained in said deed dated April 7, 1955, a straight line projected from the down stream tip of the island in the Potomac River known as Van Deventer Island to a point which marks the southwesterly corner of such 519 acres and the northwesterly corner of lands owned by H. Grady Gore and Jamie S. Gore; which approximately 519 acres of land are understood to comprise approximately the area outlined in red on Exhibit A hereto."

2. The exact number of acres comprising the Property is to be determined by a survey ot be made by a registered Virginia surveyor at the cost of the Vendee, and the purchase price shall, subject to the provisions of paragraph 11, below, be an amount equal to $537.50 per acre as so determined, with any fraction of an acre less than one-half being disregarded, and any fraction of an acre equal to, or greater than, one-half being treated as a full acre. The Vendor hereby acknowledges the receipt from the Vendee of a deposit of $24,000 which is to be applied against the purchase price at the time of settlement and otherwise dealt with as hereinafter provided.

3. Subject to the terms and conditions hereinafter set forth, the parties hereto are required and hereby agree to make settlement for the Property in accordance with the terms of this Agreement on November 1, 1955, on which date the Vendee will pay to the Vendor the balance of the purchase price and the Vendor by a good and sufficient general warranty deed will convey to the Vendee title to the Property in fee simple, good of record and in fact and free and clear (subject to the provisions of paragraph 7, below) of all liens and encumbrances whatsoever, but subject to covenants, conditions, restrictions, rights-of-way, and easements of record, if any, provided such covenants, conditions, restrictions, rights-of-way, and easements are not such as to prevent, hamper, or interfere in any substantial way with the Vendee's proposed use of the Property as outlined in paragraph 9, below.

4. Settlement is to be made at the offices of Messrs. Clarke, Richard, Moncure & Whitehead, 108 North Fairfax Street, Alexandria, Virginia, and deposit at such offices of the balance of the purchase price, the deed of conveyance, and such other papers as are required of the parties hereto by the terms of this Agreement shall be considered a good and sufficient tender of performance of the terms hereof. Possession is to be given at the time of settlement.

5. Taxes shall be adjusted to the date of settlement, but such adjustment shall be made only after receipt from Loudoun County, Virginia, of the real estate tax bills for the calendar year 1955; examination of title, survey, notary and recording fees shall be at the cost of the Vendee; preparation of the deed and affixation of the necessary Federal documentary tax stamps shall be at the cost of the Vendor; and special assessments, if any, for improvements completed prior to the date of settlement, whether assessment has been levied or not, shall be paid by the Vendor or allowance made therefor at the time of settlement.

6. In the event action is necessary to perfect the title to the Property or to correct any defects reported by the title examiner, the Vendor agrees to take such action promptly at its own expense, and the time herein specified for settle-

ment shall be extended for such reasonable period (not longer than three months) as is necessary for such perfecting of title; provided, however, that the Vendee may, if it so elects by written notice to the Vendor, waive any such requirement or defect at or at any time prior to the expiration of said three month period or may perfect title through exercise of its power of eminent domain at the cost and expense of the Vendor.

7. The Vendor represents that the Property is presently encumbered by a certain deed of trust dated April 7, 1955, and recorded in Deed Book No. 344, Page 210, of the Land Records of said Loudoun County, Virginia; agrees that it will cause the Property to be released from the lien of such trust not later than January 15, 1956; and agrees that if the Property is not so released prior to or simultaneously with the settlement hereunder then of the balance of the purchase price payable by the Vendee hereunder at settlement, an amount sufficient to secure such release shall, at the time of settlement, be paid by the Vendee, in escrow, to Messrs. Clarke, Richard, Moncure & Whitehead, settlement attorneys, with the terms of such escrow being (i) that such moneys shall be promptly paid over by such attorneys to the Vendor upon, or simultaneously with, the Property being released (to the satisfaction of such attorneys and of the Vendee) from the lien of such trust prior to January 15, 1956, and (ii) that such moneys shall be promptly returned by said attorneys to the Vendee, if the Property shall not have been so released prior to January 15, 1956.

8. Following settlement for the Property in accordance with the terms hereof, cattle belonging to the Vendor may be allowed by the Vendor to graze on the Property until a reasonably cattle proof fence shall have been installed along the westernly boundary of the Property; provided, however, that the Vendor agrees to indemnify and hold harmless the Vendee against and from any and all liability, cost, damage and expense on account of damages to or injury suffered by cattle while so on the Property, if such cattle are owned by the Vendor or by persons other than the Vendee. The Vendor agrees that unless such a reasonably cattle proof fence shall have been theretofore installed by the Vendee, it will, not later than March 15, 1956, install a five-strand barbed wire line fence along said westerly boundary, and the Vendee agrees that it will reimburse the Vendor for 50% of the cost of any such line fence which may be so installed by the Vendor.

9. (a) The Vendee presently intends to use the property as the site for a steam electric generating station. If at the time for settlement hereunder, the Vendee has not received all zoning and other governmental and municipal authorizations (including water impounding and diversion authorizations) which it believes requisite to permit it so to use the Property then the Vendee shall, if it so elects, by written notice to the Vendor, be released from its obligations hereunder. In the event the Vendee shall so elect to be released hereunder, the $24,000 deposit made by the Vendee at the execution and delivery of this Agreement shall be retained by the Vendor and the Vendor shall be released from its obligations hereunder. The Vendee agrees to use its best efforts to obtain, prior to the time of settlement hereunder, all such authorizations which it believes to be so requisite, and the Vendor agrees fully to cooperate with the Vendee in the obtaining of such authorizations.

(b) The Vendee understands that in connection with its applying for such zoning changes or exceptions or variances as may be necessary to enable it to use the Property as the site for a steam electric generating station, the Vendor may apply for zoning changes or exceptions or variances to enable some or all of its remaining lands in the vicinity of the Property to be used for industrial purposes, and the Vendee agrees fully to cooperate with the Vendor in the making and prosecution of such applications.

10. Exclusive possession of the Property shall remain in the Vendor until settlement is had hereunder, but the Vendee shall have the right, prior to the time of settlement hereunder, through its agents, employees, and independent contractors, to enter upon the Property, to the extent reasonably necessary, for the purpose of surveying the Property, and for the purpose of making engineering, geological, and topographical studies thereof, including the right to make appropriate test borings, etc., to determine the suitability of the Property for the purpose to which the Vendee desires to put it, as set forth in paragraph 9, above. If, as a result of such studies and tests, the Vendee shall determine that the Property is not, as a practical or economic matter, suitable for use as the site for a steam electric generating station, it shall, with reasonable promptness so advise the Vendor and shall, if it so elects by written notice to the Vendor, be released from its obligations hereunder. In the event the Vendee shall so elect to be re-

leased hereunder, the $24,000 deposit made by the Vendee at the execution and delivery of this Agreement shall be retained by the Vendor and the Vendor shall be released from its obligations hereunder. In the making of such studies and tests the Vendee will use reasonable efforts to avoid damage to the Property, and to make good, to the extent reasonably practicable, any such damage which may occur, but in no event shall it be liable to the Vendor for any damage to the Property necessarily incidental to or resulting from the making of such studies and tests. However, the Vendee does hereby agree to indemnify and hold harmless the Vendor against and from any and all liability, cost, damage and expense on account of any damage to personal property or injury (including death) suffered by any person as a result of the making of such studies and tests.

11. In the deed conveying the Property to the Vendee there shall be reserved to the Vendor, for the benefit of the other land now owned by the Vendor which is not included in the Property and which lies to the west and south of the Property, an easement and right-of-way sixty feet wide extending, in a generally easterly and westerly direction, from the road known as "Pike River Road" to such other land of the Vendor, such easement and right-of-way to be located along a course to be selected by the Vendee; provided, however, that the course so selected shall lie not more than two hundred and fifty feet north of the southerly boundary of the Property and shall be a course reasonably useable as a road or street without excessive amounts of filling or bridging and without excessive grades. The purchase price payable by the Vendee for the Property, determined as set forth in paragraph 2, above, shall be reduced by an amount equal to the product obtained by multiplying $537.50 by the number of acres of the Property occupied by said easement and right-of-way as definitively located and surveyed. It is further agreed that if, subsequent to the delivery of the deed reserving said easement and right-of-way as aforesaid, the Vendee shall acquire additional lands abutting on the southerly boundary of the Property, it may, if it so elects by written notice to the then property owners having the right to use said easement and right-of-way, require them to surrender, by deed, their rights in and to said easement and right-of-way provided they shall simultaneously receive from the Vendee similar rights in and to a similar easement and rights-of-way extending along such course as the Vendee may select to the south of the Property and further provided that if a road shall have been theretofore constructed along part or all of the easement and right-of-way originally so reserved to the Vendor hereunder that then the Vendee shall bear the full cost of constructing a similar road along the new easement and right-of-way substituted as aforesaid for the original reserved easement and right-of-way.

12. The Vendee agrees that in the event railroad facilities providing a rail connection to the line or lines of a railroad common carrier are constructed on the Property subsequent to its purchase by the Vendee and the line or lines of such common carrier are not so located as to make possible a rail connection thereto from the other land now owned by the Vendor which is not included in the Property and which lies to the west and south of the Property, then in such even the Vendee will, within one year after such railroad facilities on the Property have been constructed and become ready for service, grant to the Vendor an easement and right-of-way (not less than 50 feet in width) for, and sufficient to accommodate, a single spur railroad track from such railroad facilities on the Property to such other land owned by the Vendor, together with the right to make reasonable use of said railroad facilities on the Property as part of a rail connection between the Vendor's said other land and the line or lines of said common carrier. The location and course of such easement and right-of-way shall be as selected by the Vendee; provided, however, that insofar as the topography and the Vendee's proposed use of the Property reasonably permit it shall not involve excessive grading, bridging, or filling. The Vendee shall not be required to bear any of the costs involved in constructing or maintaining such railroad spur and at the time of the granting of such easement and right-of-way the Vendor shall pay to the Vendee an amount equal to the product obtained by multiplying $537.50 by the number of acres of the Property occupied by said easement and right-of-way as definitively located and surveyed.

13. The Vendor agrees that within one year after the location of the railroad facilities, if any, to be constructed on the Property has been definitively established (as evidenced by written notice thereof from the Vendee to the Vendor) it will grant to the Vendee an easement and right-of-way, over the other land now owned by the Vendor which is not included in the Property and which lies to the west and south of the Property, for the construction, operation, and maintenance thereon of electric distribution and transmission lines (overhead and/or

underground) and related facilities, which easement and right-of-way shall be 160 feet in width and shall extend in a generally southerly course from the southwesterly corner of the Property, with the easterly boundary of said easement and right-of-way coinciding (except where otherwise mutually agreed by the parties hereto) with the easterly boundary of such other land owned by the Vendor, as such boundary exists immediately following the execution and delivery of this Agreement. The Vendor shall retain all rights of use in the property covered by said easement and right-of-way provided said uses shall not be inconsistent, or interfere, with the use of the easement and right-of-way by the Vendee for the purposes above set forth. Such grant shall be made against payment by the Vendee to the Vendor of an amount equal to the product obtained by multiplying $537.50 by the number of acres occupied by said easement and right-of-way as definitively located and surveyed. In the event the easterly boundary of said easement and right-of-way as thus definitively located and surveyed lies to the west of, and does not coincide with, the easterly boundary of said other land owned by the Vendor and not included in the Property, as such boundary exists immediately following the execution and delivery of this Agreement, then the Vendee will purchase from the Vendor all land intervening between said easterly boundaries at the price of $537.50 per acre upon demand by the Vendor and delivery of a general warranty deed or deeds conveying title in fee simple good of record and in fact, subject to easements and rights-of-way then of record.

14. The Vendee may find it necessary or desirable, in its construction and operation of a steam electric generating station on the Property, to increase the height of the existing dam in the Potomac River which is known as "Seneca Dam" and/or to construct a diversion dam between the Property and the island in said river which is known as "Tenfoot Island." If the construction of any such diversion dam or any such increase in the height of Seneca Dam is begun within the six years next following the date of this Agreement and if, in the case of an increase in the height of Seneca Dam, such increase is not in excess of five feet, then the Vendee shall not, as a result thereof, incur any liability to the Vendor for the flooding or overflowing of any lands now owned by the Vendor and not included in the Property; provided, however, that if any such action shall be taken by the Vendee and if, as a result thereof, there shall at any time be, at any point on the lands now owned by the Vendor which are not included in the Property, an increase in excess of two feet in the height of the waters of the Potomac River over the average height of such waters at the times of the annual high flows of said river during the fifteen years preceding the commencement of such construction (based upon the flow measurements published by the Corps of Engineers, U. S. Army) then the Vendee shall be liable to respond in damages, to be computed at the time, for any such flooding or overflowing resulting from such excess increase in the height of such water.

15. The Vendee agrees that in developing the Property for use as the site for a steam electric generating station it will, unless the construction of appropriate railroad facilities prevents, leave a screen of trees not less than 50 feet wide along the westerly boundary of the Property.

16. The parties hereto further agree that all roads between the Property and other lands now owned by the Vendor and not included in the Property are to be closed and abandoned except as otherwise expressly provided in paragraph 11, above.

17. The Vendee agrees that in constructing and operating a steam electric generating station on the Property it will install, maintain, and operate on all boilers in said generating station suitable fly-ash collector equipment of modern design.

18. Simultaneously with the execution and delivery of this Agreement, the Vendee has entered into a purchase contract with Glenn U. Richard, Trustee, for the purchase by the Vendee and the sale by said Trustee of the island which is known as "Tenfoot Island" and is located in the Potomac River to the north of the Property, which contract provides that settlement thereunder shall be made simultaneously with the settlement for the Property hereunder. Settlement hereunder shall be made simultaneously with settlement under such contract, and it is understood and agreed that the obligations of the Vendee hereunder are conditioned upon the full performance of said purchase contract by said Trustee.

19. If for any reason other than a default hereunder by the Vendee, or as otherwise provided in Paragraphs 9 and 10, above, the Vendor shall not sell and convey the property to the Vendee as required by the terms hereof, then the $24,000 deposit made with the Vendor by the Vendee at the execution and

delivery hereof shall be forthwith returned by the Vendor to the Vendee. No such return of such deposit shall prevent the Vendee from taking any other action legally available to it for the enforcement of the Vendor's obligations hereunder or for damages occasioned by any default insured against by title insurance policy issued to the Vendor, limited to the amount of said policy, or by any default of the Vendor which is willful or is correctible by the Vendor.

20. Any notice required or permitted hereunder to be given by the Vendor to the Vendee shall be sufficient if sent by first-class mail, postage prepaid, addressed to the Vendee at 929 E Street NW., Washington 4, D. C., and any notice required or permitted hereunder to be given by the Vendee to the Vendor shall be sufficient if sent by first-class mail, postage prepaid, addressed to the Vendor, % Messrs. Clarke, Richard, Moncure & Whitehead, 108 North Fairfax Street, Alexandria, Virginia.

21. This Agreement shall be binding upon and enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and assigns, and shall survive the execution and delivery of the deed of conveyance called for by paragraph 3, above.

IN WITNESS WHEREOF the parties hereto have caused these presents to be duly executed and delivered as of the day and year first above written.

[CORPORATE SEAL] POTOMAC ELECTRIC POWER COMPANY,
Vendee.
By G. BISSET, *Senior Vice President.*

Attest:
G. M. THOMPSON, *Secretary.*
TRIPLE SEVEN STOCK FARM,
A General Partnership, Vendor.
By ARTHUR T. ANDROUS, [SEAL]
By GLENN U. RICHARD,
Attorney in fact.
JOHN E. MCPHERSON. [SEAL]
GLENN U. RICHARD. [SEAL]
DONALD E. BALL. [SEAL]
A. P. DIGIULIAN. [SEAL]
ANDREW W. CLARKE. [SEAL]
WM. A. MONCURE. [SEAL]
A. CARTER WHITEHEAD. [SEAL]
THEODORE C. ROUMEL. [SEAL]
ARISTOTLE H. C. ROUMEL. [SEAL]
WM. P. CROOM, JR. [SEAL]

Being all of the partners of said Triple Seven Stock Farm.
[Approved as to Form CM, August 3, 1955.]

DISTRICT OF COLUMBIA,
City of Washington, To Wit:

I, Lucille J. Sheriff, a Notary Public in and for the District of Columbia aforesaid, do hereby certify that G. Bisset and G. M. Thompson, whose names are signed to the writing above, bearing date on the 3d day of August 1955, have acknowledged the same before me in my District aforesaid.

Given under my hand this 3d day of August 1955.

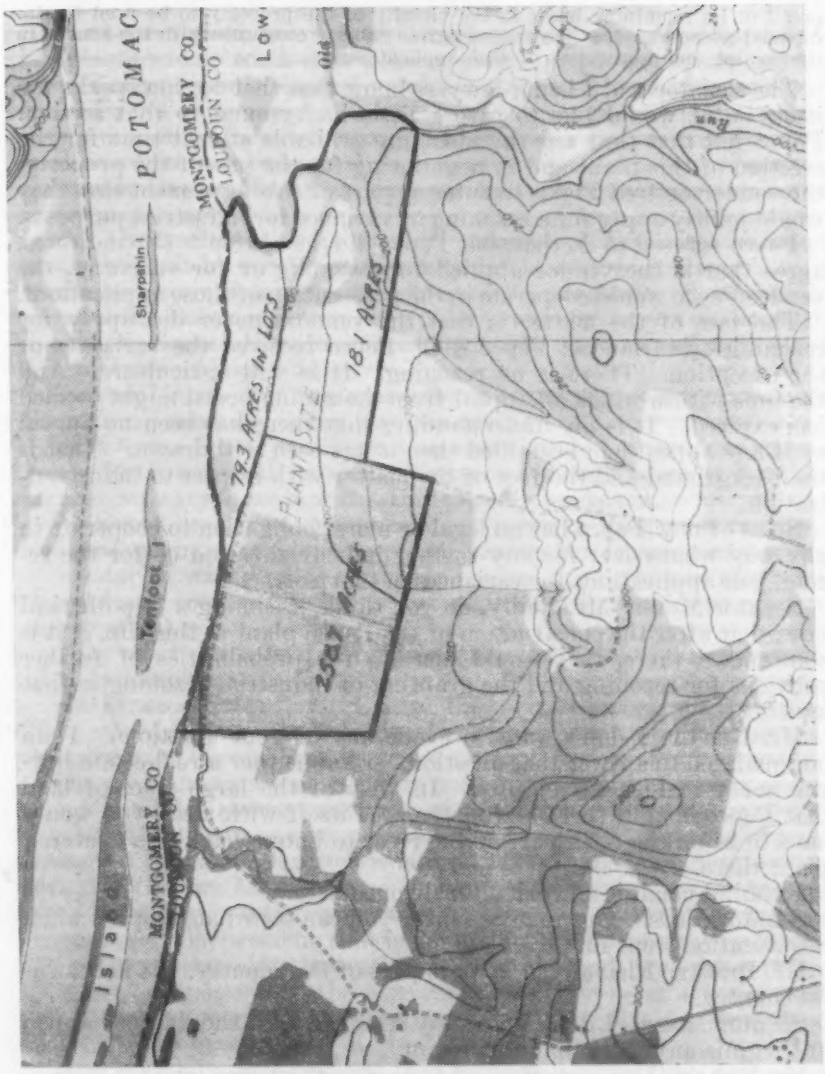
[NOTARIAL SEAL] LUCILLE J. SHERIFF,
Notary Public, D. C.

COMMONWEALTH OF VIRGINIA,
Corporation of Alexandria, To Wit:

I, Patricia M. Cunningham, a Notary Public in and for the State and Corporation aforesaid, do hereby certify that Arthur T. Androus by Glenn U. Richard, his attorney in fact, John E. McPherson, Glenn U. Richard, Donald E. Ball, A. P. DiGiulian, Wm. P. Croom, Jr., Andrew W. Clarke, Wm. A. Moncure, A. Carter Whitehead, Theodore C. Roumel and Aristotle H. C. Roumel, whose names, as the partners of Triple Seven Stock Farm, are signed to the writing above, bearing date on the 3d day of August, 1955, have acknowledged the same before me in my Corporation aforesaid.

Given under my hand this 5th day of August, 1955.

[NOTARIAL SEAL] PATRICIA M. CUNNINGHAM,
Notary Public.



Mr. REILLY. In discussions with your able assistant and the members of your staff our facilities and any documents we have are readily and quickly available to the committee and staff.

Senator MORSE. I appreciate that and I want to thank the company for the cooperation that has been extended to my office and the District of Columbia Committee, too.

Mr. REILLY (reading):

SEC. 9. (b) The vendee understand that in connection with its applying for such zoning changes or exceptions or variances as may be necessary to enable it to use the property as a site for a steam electric generating station, the vendor may apply for zoning changes or exceptions or variances to enable some

or all of its remaining lands in the vicinity of the property to be used for industrial purposes. And the vendee agrees fully to cooperate with the vendor in the making and prosecution of such applications.

The Senator and I being lawyers know that that section speaks for itself but I would like to give a little background to that section. Pepco felt that that was the ideal site available at that time for the erection of this plant and in negotiating for the sale of the property, the vendor desired Pepco to enter as part of this agreement that they would jointly apply for a rezoning or variance for industrial purposes.

Pepco refused to do that, but Pepco did, as section 9 (b) indicates, agree that if the vendor applied for rezoning or for variances, the vendee Pepco would cooperate in the prosecution of those applications.

The fact of the matter is that the vendors never did apply for rezoning or variances; Pepco did. Pepco received the variances or the exception. There is no rezoning. It is still agriculture. And the time within which an appeal from the zoning board might be filed has expired. It is my understanding that there has been no appeal or if any appeal had been filed then it has been withdrawn. That is the background and the fact of the matter with respect to industrialization.

So as of now Pepco has no legal or moral obligation to cooperate in any way whatsoever for any further industrialization or for the rezoning or applications for variances in that area.

Senator MORSE. Mr. Reilly, do you think, assuming a hypothetical now, that after the construction of the Pepco plant at this site, if it is constructed there, that would increase the probabilities of further petitions for rezoning and the granting of industrial rezoning in that area?

Mr. REILLY. I don't want to evade any of your questions. I am not qualified to answer that question. I am neither a real-estate lawyer nor a real-estate venturer. In view of the large tract of land that Pepco bought there and in the area itself with trees, you would have to be on the open part of the river to know that there is even a plant there.

I remind you it is an agricultural-zoned area.

Senator MORSE. Out in my country you can see what happens when reforestation steps in.

Mr. REILLY. I have been in your part of the country. It is beautiful country.

Senator MORSE. I don't know any reason why it should not happen in Virginia any more than in Oregon.

Mr. REILLY. I am not qualified to answer your question.

Senator MORSE. I accept your answer.

Mr. DUNN. May I make a statement with regard to that. We thought and still think that if we get a large tract of land and build a powerplant and have it surrounded by woods and trees, it will not depreciate the land that is surrounding that area. We have a case in point. Your Potomac River plant at Alexandria, Va., 200 yards away from it there are apartment buildings, and so forth, and residences. The modern operation of powerplants in these times and in the future are very good and do not cause any difficulties to neighbors.

So far as industrial relations are concerned, I think that those that have a control over it, such as zoning or county zones and so forth can pick the type of industries that will not pollute the Potomac River.

There are a great many small manufacturing concerns, like assembly plants and so forth that will not pollute it. I think it would be wise if the people in control would name the type of industry that could be put into upper Potomac River. We are not interested in seeing any large industry come into this area. If it is any industry at all it would have to be small industry.

Senator BEALL. Mr. Dunn, do you contemplate building a railroad into this property?

Mr. DUNN. Into this particular property, I think the railroad would be built by the Washington & Old Dominion Railroad and it would be a spur line right straight into the property. It would not parallel the Potomac River. It would be at right angles to the river.

Senator BEALL. How long would the spur be from the main line?

Mr. DUNN. About 4 miles.

Senator BEALL. Your company is not going to pay for that at all, the railroad company is going to pay for it?

Mr. DUNN. A lot will depend on negotiation for the freight rate and so forth, what will happen. We are not in negotiation at this time because we want to see how this thing finally works out.

We have a great many negotiations to carry on among the railroads and coal operators and other people before we can make up our minds.

Senator BEALL. Wouldn't it be the natural thing, the best thing, for the railroad company to try to get additional industries to come in there on that spur?

After all it costs about a hundred thousand dollars to build a mile of rail; doesn't it?

Mr. DUNN. About that. I think they would be interested in that. That would be subject to the local controls over the industries that are permitted to come in.

The next question that came up was the building of dams; one at River Bend for storage reservoir of water for the future supply of Washington and its environs. Colonel Adams can correct me if I am wrong. I think the elevation would be 225 feet above sea level. This property that we have in mind in Loudoun County is around about 206. That brings into the account that we have to think about is the economics of the problem, that is dollars and cents, whether or not we can go to another site above 225 feet or above and have the problem of water pumpage until the reservoir is built or be at a lower level and then have to make an investment at a later date for local flood control of the plant.

That is an economic problem that we have not been able to make a decision on at this time.

And we will continue to study this. We will work these things out. We would like very much to cooperate fully with the Corps of Engineers in any plans that they have for the Potomac River. As I said at the outset we are not interested in becoming a menace to the water supply of the District of Columbia or any other community.

Senator MORSE. Mr. Dunn, having mentioned the site matter, assuming this hypothetical for the sake of argument, that the plant is not built at the particular site you are now considering. Have you made a sufficient study of other sites to know the comparative usefulness for your best interests of other potential sites?

Mr. DUNN. We are studying other possibilities. We have not come to any other conclusion about other sites. It would appear if

we went farther up the river then the water conditions for condensing purposes would not be as good as it is around this particular area we are talking about now.

Senator MORSE. Because of supply and flow.

Mr. DUNN. Because of supply and flow.

Senator MORSE. What about the sites that we have heard mentioned in the papers and about which I know nothing except what has been mentioned in the papers, a site south of Alexandria?

Mr. DUNN. We have a problem from the standpoint of operation. That we have three plants now. The Alexandria plant, what we call the Potomac River plant is the newest one. That will be at its ultimate capacity in 1957. We are adding two units there now. One will be in operation in 1956. The other will be in operation in 1957. Those 3 plants are within a radius of 5 miles of the Capitol. We have been advised by security people that in case of bombing we should have a plant away from the present plant, away from the Capitol. That is one of the reasons why we went to the northwest, because we think from an operational standpoint, our own operations, we should have a source of supply in that area.

Senator MORSE. Also a plant south of Alexandria gives you a little different kind of transmission-line problem than one to the northwest.

Mr. DUNN. That's right.

Senator MORSE. If I interpret what you said correctly, that of the alternative sites you are considering, you are giving careful attention further up the river rather than going south of the river.

Mr. DUNN. That's right. Colonel Adams was talking about a period from now to 1970 and 1975. I think we can make the prediction now that not only will we have to build this plant in the northwest area but we will also have to build another one by 1970 or 1975 or at least get one started.

The load growth in this area is really tremendous. It is our duty to be in a position to supply all our customers with all the electricity they want to use.

Senator MORSE. These elevation figures of 225 for a possible dam site and 206 for your plant site, there is no question about the fact that the dam would flood out your site unless you spent some money for local flood control around the plant.

Mr. DUNN. That's right. That gets us back into an economic problem of just straight dollars and cents on investments. That is something we will have to study.

Senator MORSE. Anything further?

Mr. DUNN. I have nothing further. As I say I want to thank the Corps of Engineers for their cooperation and we want to further cooperate with them in anything they have in mind for the future.

Senator MORSE. At the present time the company has the project in suspension awaiting further consideration of the facts such as are being brought out here today?

Mr. DUNN. That's right.

Senator MORSE. And further studies by interested official groups and also pending your further study of possible alternative sites based upon your own evaluation of the information that is made available to you?

Mr. DUNN. That's right, that is the reason I wanted to get this temperature thing lined up so in case we do move to another place that question will not come up again. Then we know how much room we have to move in. If the dam at River Bend is built, and we are at an elevation above the 225 feet, the operation of that plant still would not cause any difficulty to the water supply or the quality of the water for the District of Columbia and the other communities.

Senator MORSE. Now, Mr. Dunn, may I say good naturedly, with the two gentlemen on my right and left, ignoring me for the moment, because I have a question that I want to raise, only to clarify that for myself because as you can well imagine in my position here as chairman, I have had certain preparatory representations made to me. One of them is in regard to the location of this plant in either one of the two jurisdictions of the Judge and the Senator, Virginia and Maryland.

If you move up the river for an alternative site, you would still be in a position to make a decision as to whether you wanted it in Virginia or Maryland. There are sites up the river in both Virginia and Maryland; is that correct?

Mr. DUNN. That is right. It will all depend on the topography of the particular site and the water conditions that we would have to have and rail facilities and other economic problems that are involved.

Senator MORSE. I want this question to be perfectly fair, because its implications could be unfair. If you assumed that I was basing it on any assumptions concerning engineering feasibility, let me put the question this way: Assume there are 2 sites up the river, 1 in Maryland and 1 in Virginia that are equally feasible from an engineering standpoint as a second choice over your first one, does the tax question enter into the picture as a factor in your decision?

Mr. DUNN. Well, it is our duty to find the cheapest sources of power for our system and I think the tax question would enter into it.

Senator MORSE. It would if I were in business.

Mr. DUNN. Because it is a very important matter, because that is a continuing annual charge, and all we are interested in is efficiency and good operation of a powerplant. We don't want to have added costs to that if we can find other ways of eliminating costs.

Senator MORSE. Did the tax question carry some weight in the selection of the site you now prefer?

Mr. DUNN. Not too much. It was more of an engineering problem. It was more of an engineering situation there than it was anything else.

Senator MORSE. I want to give you an opportunity to get rebuttal into the record on every point that is being considered on this matter of which I know. You have already testified briefly on it. One is on this matter of land values for residential areas. I don't have to tell you I am sure that part of the protests are coming from landowners in the area proposed for the site that have spent considerable amounts of money in developing so-called retirement residences and retirement farms, and who allege that the building of your plant will turn the area into an industrial area and greatly reduce the value of the property for residential purposes, although increase the value of their own farms for industrial purposes, but that is not what they are interested in.

I alluded to that this morning in my examination of the colonel. I think it is only fair that you should have this stressed in the record so you can make a fuller statement on it if you care to, what you think the effect of your plant would be on residential landowner values.

Mr. DUNN. I don't think the operation and construction of a power-plant would have a detrimental effect on land values from a residential standpoint.

If we have enough property and can leave the woods around it so that it is blocked from view and other precautions we can take. If you are far enough away from it, you are bound not to have any effects.

Senator MORSE. How many employees would your plant hire?

Mr. DUNN. We would use 120 maximum, that is 3 shifts so you would have some 40 per shift. Maybe the day shift would have a little more than the 4-to-12 or the 4-to-8 shift.

Senator MORSE. Do you contemplate that most of those employees would be interested in living within a housing settlement within the area of the plant?

Mr. DUNN. I should think they might because of the ease of getting to work. We do not contemplate, however, putting any employees' houses on any land.

Senator MORSE. I understand that.

Is there anything else you would like to add?

Mr. DUNN. No.

Mr. REILLY. I would like for the record in view of the discussion that Judge Smith had with Colonel Adams, to have the record show information which the very able and very frank Colonel Adams has given that I got from that conference we had yesterday on this whole subject, that was since the preparation of the report that is in the record, House Document 622, there have been very subsantial changes, Senator in the type of improvement in that area. It used to be at that time that used to be open land area. Now it is drastically changed into a residential section and so forth.

The other interesting feature in figures was that the development of this dam would require the flooding of 32,000 acres in Virginia and 16,000 acres in Maryland.

When you get into the cost thing, it becomes a very critical factor. I think in view of the discussion between the Judge and Colonel Adams the record ought to contain those figures.

Senator MORSE. Senator Beall?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. Mr. Dunn, you referred to your plant in Alexandria.

Mr. DUNN. Yes.

Representative SMITH. I happen to pass it pretty much every day in my life on Mount Vernon Boulevard. It is just off the boulevard. It is a large structure. To a countryman it looks like a very big thing. I don't know what its generating power is. It is in the heart of the city of Alexandria; all around that is residential and apartments and so forth along the Mount Vernon Boulevard and through the city of Alexandria. I would like to have you say whether you had any complaints about the coal or the treatment of the coal or any other

complaints against the operation of that plant since you put it into operation.

Mr. DUNN. I can say to my knowledge we have not had any complaints. I would like to ask Mr. Bisset who is in charge of engineering and operations what experience he has had?

Mr. BISSET. There was only one case, Congressman. That was before we covered the pile. We were putting coal into storage and in the summertime there are very high winds and a thunderstorm came in from the northeast and the winds wiped the coal dust off the pile and carried it into this apartment development which is about 220 yards directly to the south. It did occur at a time when the storm was predominantly at that time of the year would come in from the northwest. We did not have the pile covered. We did cover it and it is our practice to keep it covered. We have never had any complaints since then.

Representative SMITH. Of any kind about the operation of that plant although it is surrounded by residential areas?

Mr. BISSET. That is correct.

Representative SMITH. They are rather high-class residential areas as I recall.

Mr. BISSET. Yes, sir. At the hearing in Leesburg there was a representative from the Alexandria City Council who testified to that fact that they had not had any complaints.

Representative SMITH. I might say that that is my observation. I have never heard of any.

Thank you, Senator Morse.

Senator MORSE. Anything further, Mr. Dunn?

Mr. DUNN. My associate here calls my attention to the fact that somewhere between now and 1975 we may have to find the fourth site. We don't know whether that would be on the upper Potomac River or not. We doubt it.

The load growth will dictate in that period of time where another plant should be located.

Senator MORSE. Would you make a statement for the record of, first, the engineering feasibility, and, second, the difference in cost of building a generating plant on a site not at all connected with the river?

Mr. DUNN. That is to be somewhere near a river for water supply.

Mr. BISSET. It can be done, Senator, using these so-called cooling towers, but you have to have a large volume of water to supply to initially fill the cooling system and then for the makeup which you would have to do because of evaporation.

Senator MORSE. The purpose of my question—and then you can supplement it in any way you want to—I want to bring out for the record what the difference in cost would be if you used the cooling tower method without immediate accessibility to a river. Is there any location in this area suitable to you, taking into account the cost, where you could build the cooling tower operation without the use of a river?

Mr. BISSET. No; I don't think there would be, Senator, because of the capacity of this type of plant that we are talking about. We are talking about a plant of 600,000 killowatts capacity. In smaller plants that could be done; yes.

Senator MORSE. There is no available lake from which you could get or divert from canals the necessary amount of water to handle your cooling towers?

Mr. BISSET. We don't know of any such location.

Senator MORSE. In some few instances in the country it has been necessary for power companies to really develop from wells and other sources and artificial lakes to use for the cooling tower system.

Mr. BISSET. That's correct.

Senator MORSE. We have no natural lake here that you could use by way of channeling off of the lake that would supply the water; have we?

Mr. BISSET. No; we do not.

Senator MORSE. So it is your testimony that in the interests of the most efficient and economic operation you are going to have to find some stream in the area from which you can get some water, if you go to the cooling tower method?

Mr. BISSET. Yes; that is correct.

Senator MORSE. Even if for your cooling towers, to say nothing about your direct flow into your condensers.

Mr. BISSET. That's correct.

The use of the cooling towers adds about a million dollars to the cost of each unit installed. So in this particular problem we are talking about the 4 units would add about $4 million to the initial cost of the plants. Then you would lose considerably in the efficiency of the operation of the plant. You would not get that cooling effect that you do from the river.

Senator MORSE. That is what I wanted to get into the record, that kind of evidence, which means in the last analysis a difference in the rate.

Mr. BISSET. Yes.

Senator MORSE. Am I correct that for some weeks of the year, maybe a couple of months in the year, the water in this reach of the Potomac is so low that when you get your plant completely constructed and in operation, you will have to use some tower cooling system for that period of time because if you used the river for the entire operation you would practically put the river through your condensers?

Mr. BISSET. That is correct, from the figures we have, the data from the United States Engineers the lowest flow I think which occurred in 1930 and has not occurred since that we would have 2 units on river flow operation, the other 2 units would be on cooling tower operation for that period of low flow.

Senator MORSE. When the volume of the flow of the river is adequate you would have the four units operating on the river and none on the cooling towers?

Mr. BISSET. That is correct.

Senator MORSE. Anything further? Do you gentlemen have anything further?

Mr. DUNN. No.

Senator MORSE. Before we close the record, which will be in the very next few days, may I say that you are welcome to prepare and submit to the clerk of the committee for insertion in the record any appropriate memorandum bearing upon the hearings which you would

like to submit, either by way of affirmative substantive material or by way of rebuttal material.

That is all, gentlemen.

Mr. REILLY. I would like to thank you very much for the atmosphere in which this hearing has been conducted.

Senator MORSE. Colonel Adams, may I ask you a further question?

Mr. Reilly, I want to have you listen to this question because you may wish to supplement Colonel Adams' testimony.

Colonel, I understood Mr. Reilly to testify that the River Bend Dam if completed on the basis of the information that was placed in the record in 1946 would flood 32,000 acres of Virginia land and 16,000 acres of Maryland land.

I would like to have your comment on that testimony.

Colonel ADAMS. I would like to have the question addressed to Mr. Reilly. As I understood, he attributed that information to statements I had made in a conference just a few days ago.

Mr. REILLY. Yesterday I thought when I took notes that you had read from a footnote and I thought it was public knowledge that the figures you were talking about were 48,000 and you broke it down

Colonel ADAMS. I did not talk at all about acreages that would be flooded by dams. What I was talking about at that time was the acres that would be irrigated. We thought by 1970 or 1975 in Virginia and Maryland by supplementary spray irrigation.

Mr. REILLY. Whatever the facts are that is what I want the Senator to have.

Senator MORSE. I understand that.

Colonel ADAMS. In my testimony this morning I used the figure of 48,000 acres to support my figure of 160 million gallons of water per day supplementary irrigation. That was based on an estimate of 32,000 acres in Virginia and 16,000 acres in Maryland. That information I shall call on Mr. Byrd for the name of one of the gentlemen, Dr. Young. Do you have the information? We have a letter, a very recent letter that we received by letter from Dr. H. N. Young, director of the Virginia Agricultural Experiment Station, Clarksburg, Va., a prediction of acreages in the order of 32,000 under irrigation in the Potomac Valley in Virginia by around 1970 to 1975.

I understand that Dr. Young is on a committee appointed by the Governor of Virginia, a legislative advisory committee with some terms of reference pertaining to water resources. And likewise Mr. Harry B. Shaw, chief engineer of the Suburban Sanitary Commission is on a similar commission appointed by the Governor of Maryland.

In conferences with Mr. Shaw, we received from him a statement in the order of 16,000 acres to be under supplementary spray irrigation in Maryland. That was the information to which Mr. Reilly referred and we have been talking about dams and irrigation in a rather intermingled manner and I can see how he got the two somewhat confused.

Senator MORSE. For the purpose of the record, would you supply for insertion at this point, a memorandum that would show how much land in Virginia and Maryland would be flooded by the River Bend Dam if built and also include in the memorandum a statement as to the nature and quality and use of that land at the present time?

Colonel ADAMS. We will be happy to supply that for the record.

Senator MORSE. Thank you.

(The following memorandum was subsequently furnished:)

The following data, extracted from the files of the River Bend Dam studies prepared in 1943–44 for House Document 622, 79th Congress, pertain to properties in Virginia and Maryland which would be involved in the acquisition of lands for the reservoir with pool level at 235. The basis of estimate provided for purchase of lands to the 241 contour.

The area flooded at pool level 235 would be 28,320 acres of land and 7,680 acres of water, or a total lake area of 36,000 acres. Land to be purchased at contour 241 would be 34,920 acres, of which 1,570 acres would be in Fairfax County, Va.; 15,020 acres in Loudoun County, Va.; 12,920 acres in Montgomery County, Md.; and 5,410 acres in Frederick County, Md.

Of this purchased land, 18,330 acres would be cleared bottom land and 4,020 acres cleared upland, 4,900 acres of wooded bottom land and 7,670 acres of wooded upland.

Approximately 111 residences consisting essentially of small cabins, having an estimated average value in 1944 of less than $2,000, are located almost entirely in Maryland. Approximately 20 stores, industrial buildings, or other commercial items located in Maryland amounting in cost, as of 1944, to $204,500 will be affected. A quarry and tavern in Virginia, estimated to cost $185,000, would be purchased.

The foregoing data represents the only breakdown currently available without extensive fieldwork to bring the land-use appraisal up to date. A preliminary reconnaissance would require about 3 weeks and a complete survey would require up to 2 months.

Colonel ADAMS. Mr. Chairman——

Senator MORSE. I was going to ask if you have anything you would like to add to the record, and what I said to Mr. Dunn on behalf of the company applies also to you and your staff. This record will be open for a few days for the clerk to receive any memorandums that you wish to submit either by way of presenting a case in chief or by way of rebuttal material.

Colonel ADAMS. Surely.

There are just two or three points I would like to make by way of clarification. It was apparent to me that Mr. Sheppard Powell did not fully understand my statement about the temperature prevailing one-third of the way down from the plants. That leads me to believe I may have stated it so it is not clearly understood by the committee.

It was not my intention to say that the temperature of 14° above the river normally would persist at that level one-third of the way down. What I intended to say was that temperatures high enough to be significant, I thought would persist about one-third of the way down.

I am quite familiar with the curves prepared by Chas. T. Main which start out with the temperatures at the plants outflow and fall off on a curve. From my mental picture of that curve, it shows about the third point as being the limit of significant temperature increases.

Then Mr. Dunn mentioned the flood-pool elevation 225 several times.

I wanted to point out quite clearly that that flood-pool elevation is for a reservoir for the single purpose of providing an adequate water supply plus the very minimum releases to prevent worsening the pollution condition and that reservoir would not serve the purpose of flood control to any consequential degree or any other purpose that would be included in a comprehensive development.

The flood headwater elevation of the river bend dam recommended by the district and division engineering in 1944 was 246. But with

regard to headwater elevations and any other features about which we can furnish information that would be helpful to the Potomac Electric Co. if they consider other sites, my district will be glad to furnish the company guidance criteria for site reconnaissance purposes and as they commence to crystallize on particular sites where we can be much more helpful to them, by considering the details of the sites and making further studies in connection with the requirements for either comprehensive development or water storage, we would be most willing to do that.

I can also assure the company that we realize that they and not we should be the ones to decide whom else should be told at any particular time about the sites they are considering and we would treat all such information in strict confidence.

I would be glad to cooperate.

Senator MORSE. Thank you very much, Colonel. Anything further?

Colonel ADAMS. That is everything I have.

Senator MORSE. Senator, any questions?

Senator BEALL. No questions.

Senator MORSE. Judge, any questions?

Representative SMITH. No questions.

Senator MORSE. Thank you very much, Colonel.

Our next witness is Mr. E. S. Tisdale, director of the Interstate Commission on the Potomac River Basin.

Mr. Tisdale.

If you don't mind, Mr. Tisdale, I am going to mark for purposes of identification as exhibit 9 a resolution that the clerk of the committee has just handed me adopted by the Interstate Commission on the Potomac River Basin at their annual meeting in the Commission offices, Transportation Building, Washington, D. C., September 26, 1955, and ask that it be made a part of the record at this point. You may comment on it if you care to.

(The document referred to is as follows:)

EXHIBIT No. 9

RESOLUTION ADOPTED BY THE INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN AT THEIR ANNUAL MEETING IN THE COMMISSION OFFICES, TRANSPORTATION BUILDING, WASHINGTON, D. C., SEPTEMBER 26, 1955

Resolved, That the Interstate Commssion on the Potomac River Basin, desires to bring to the attention of the citizens of the Washington metropolitan area, the probable adverse effects on the Washington public water supply and on the aquatic life of the stream from locating a large electric power-generating plant on the Potomac a few miles upstream from the intake of the drinking water supply, that the Commission recommends to all interested agencies and Government that necessary action be taken to encourage the Potomac Electric Power Co. to locate its prospective facilities at a point downstream from the city of Washington, and that should the company refuse to locate its facilities downstream from the city of Washington, that all necessary action be taken to prevent the construction of the plant, which presents a threat to the public drinking water supply and also will affect the aquatic life of the stream detrimentally.

(Submitted by Ellis S. Tisdale, director, Interstate Commission on the Potomac River Basin.)

STATEMENT OF ELLIS S. TISDALE, DIRECTOR, INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

Mr. TISDALE. Mr. Chairman, I prepared a brief statement concerning our interest in this matter and at the present time I am serving

as director for the Interstate Commission on the Potomac River Basin. I have been in this position since July of this year. I shall read this brief statement which will take only a few minutes because it will bring out the chief points I think of our interest in the matter.

Before setting forth the official stand of the commission on the PEPCO plan location and the possible detrimental effect on the Washington metropolitan public water supply, I should like to review briefly the composition, purpose, and accomplishments of the commission in its 15-year life, indicate our cooperative relationships with the Washington District office of the Corps of Engineers to protect the water supply and briefly comment upon the action of the commission, in approving on November 9, 1955, in special session, a plan for abatement and control of the Potomac River pollution in the Washington metropolitan area.

Work of the Interstate Commission on the Potomac River Basin: This commission is the official agency of the four States, the District of Columbia, and the Federal Government to correct and prevent detrimental pollution within the 14,500 square miles of the basin. Since its work started in 1941, marked progress has been made through the organization and effective programs of State pollution control agencies in all the States and the District of Columbia.

The Savage River Dam is already having a flood-control and water-conservation effect favorable to downstream communities.

The discharge of detrimental industrial wastes has been lessened through the cooperation of industry. These State pollution control programs are improving the Potomac in the upper basin and are favorable influences which tend to safeguard the Washington public water supply.

Threats to Washington public water supply: Because of possible threats to the Washington drinking-water supply, the interstate commission was represented by its director at two meetings this past summer at the office of the Washington District Corps of Engineers, attended by Federal and State agencies concerned with pollution control and regional planning councils.

The necessity for a comprehensive master plan for sewage disposal for the Washington metropolitan area was outlined at the first meeting.

At the second meeting the possible detrimental effect of the location of the Pepco plant a few miles upstream from the water-supply intake was pointed out.

The interstate commission at its regular fall meeting in Washington on September 26, 1955, passed the following resolution:

That is the resolution you just referred to and I will not bother to read that:

Senator MORSE. I did not read it, you can read it.

Mr. TISDALE. All right. [Reading:]

Resolved, That the Interstate Commission on the Potomac River Basin, desires to bring to the attention of the citizens of the Washington metropolitan area, the probable adverse effects on the Washington public water supply and on the aquatic life of the stream from locating a large electric power generating plant on the Potomac a few miles upstream from the intake of the drinking water supply, that the commission recommends to all interested agencies and Government that necessary action be taken to encourage the Potomac Electric Power Co. to locate its prospective facilities at a point downstream from the city of Washington, and that should the company refuse to locate its facilities downstream from the city of Washington, that all necessary action be

taken to prevent the construction of the plant, which presents a threat to the public drinking water supply and also will affect the aquatic life of the stream detrimentally.

Further information bearing upon this particular use of water for cooling purposes and its effect upon the stream is contained in the September 1955 Quarterly Bulletin, State of Michigan, Water Resources Commission, under the heading "Heat, a New Pollutant," which reads as follows:

Sewage disposal men, long familiar with the setting, moved over at the pollution conference table to make room for steampower officials at a recent meeting in Lansing.

Fish mortality in the Grand River below Lansing was traced to organic waste-loading aggravated by 10° F. temperature rise from power turbine cooling. Dissolved oxygen of the river entering town was believed adequate to handle Lansing's sewage-plant effluent but it dropped substantially in passing through the turbines. The board of water and light was using the entire riverflow up to 400 cubic feet per second on days when severe oxygen depletion occurred.

Though serious in itself, the situation heralds greater trouble to come as power needs rise. Much lower flows than this summer's are to be expected (low 30-day period in 1936 summer averaged 56.6 cubic feet per second.

Reuse of water through cooling towers is indicated as necessary to keep essential dissolved oxygen content up to requisite minimum.

Recent action—Interstate Commission on Administrative and Legislative Plan for Control of Potomac River Pollution: A special committee of legal and technical experts from the Commission after careful study and consideration has developed a plan to control pollution in the metropolitan area. This plan has been sent to all interested Congressmen, asking their support in carrying it out.

I have a copy of that plan here.

Under the heading in this report on page 6, Appendix, "Recent Threats of Spreading Pollution," the report carries this statement:

The announced plans of the Potomac Electric Power Co. to construct a major generating plant along the Potomac in the lower corner of Loudoun County is a further indication of the impending development of what has heretofore been considered the outlying fringe of the metropolitan area. With the construction of any power facility, fears have been expressed by property owners on both sides of the Potomac in its vicinity that industrial development may ensue in Maryland as well as Virginia. While the power company itself is considered a threat to the potability of the District's water supply, the evolution of a substantial industrial area in its neighborhood must be viewed as a possible serious menace to the Potomac River from a pollution standpoint.

Senator MORSE. It will be marked for purposes of identification as "Exhibit No. 10" of this hearing, a copy of the report of the Interstate Commission on the Potomac River Basin Commission entitled "Proposed Overall Administrative and Legislative Plan for Abatement and Control of Potomac River Pollution in the Washington Metropolitan Area."

(The document referred to is as follows:)

EXHIBIT No. 10

PROPOSED OVERALL ADMINISTRATIVE AND LEGISLATIVE PLAN FOR ABATEMENT AND CONTROL OF POTOMAC RIVER POLLUTION IN THE WASHINGTON METROPOLITAN AREA

I. INTRODUCTION AND STATEMENT OF GENERAL PRINCIPLES

The present critical pollution of the Potomac River in the Washington metropolitan area has resulted from the area's very large and rapid population growth. Concurrently, there has been a lack of broad overall planning in this field for the

orderly future development of the metropolitan area. In addition, the local jurisdictions have not been able to provide needed waste collection and treatment facilities at a rate comparable to the area's growth.[1] (1) The growing magnitude of the problem as it affects the future of the region has not been generally recognized, particularly as it relates to the protection of public water supplies from the detrimental effects of residential and industrial development. As a result, coordinated planning on a metropolitanwide basis has been grossly inadequate. Sufficient funds have not been available for constructing comprehensive areawide waste collection and treatment works adequate for present and immediately foreseeable needs. The abatement and control of pollution of the Potomac must be attacked from a broad metropolitan area standpoint so past deficiencies may be corrected and future pollution avoided.

In this country, water-pollution control traditionally has been primarily a State and local responsibility. This stems from the form of government, in which the State holds responsibility for all governmental functions not specifically delegated to the local governments or granted to the Federal Government. Congress has repeatedly recognized this principle of primary State responsibility in its considerations of many Federal water-pollution-control bills, in its enactment of the Federal water-pollution-control law, and in its review of this law in 1953 and in 1955. Congress, however, also has recognized that there is a Federal interest inherent in interstate pollution and in the overall problem of pollution control insofar as the general welfare of the Nation is affected.

The Washington metropolitan area pollution problem, although having both local and interstate aspects, also has a special aspect which is significant in relation to the Federal interest in and responsibility concerning this problem. Washington is the Nation's Capitol and as such is the focus of attention of the entire Nation. In many respects it is a show place for the world. Its influence as a symbol to the Nation cannot be overlooked. In many ways what happens in Washington sets a pattern for action in other parts of the country.

Because Washington is the Nation's Capital there has been tremendous growth in the surrounding areas as well as in the District. Such growth has far exceeded the resources of the jurisdictions for financing necessary expansion of many types of public works. Federal responsibility for the Federal impact on other communities has been recognized by the provision of Federal funds to such communities for construction of public works, such as sewage-treatment facilities and schools.

Another factor must be considered. In this region the Federal agencies occupy within the local jurisdictions large areas of high potential tax value. The areas so occupied are removed from the tax resources of the local jurisdictions, thus materially limiting their ability to finance necessary and expensive local public improvements.

During the past 10 years all local jurisdictions have demonstrated an awareness of their responsibilities for the control of pollution (2).[1] They have developed plans for the collection and treatment of wastes, although in most cases these plans were calculated to meet local needs rather than area needs especially those which are now emerging as critically urgent problems (3).[1] Some coordination of planning among the jurisdictions has occurred but not to the point where all af the factors have been coordinated on a completely broad metropolitan area basis. Certainly, there are not now in existence any comprehensive metropolitanwide plans which anticipate the control of river pollution as and when this region approaches saturation development.

It is believed that each jurisdiction has or can obtain the necessary competence to handle the detailed planning, the construction, and the operation of necessary pollution abatement works. In Virginia and Maryland competent State pollution control agencies exist to insure hat local action conforms to overall State requirements. Also under the Federal water pollution control law certain standby authority for pollution control of interstate waters resides with the United States Public Health Service (4).[1]

II. REQUIREMENTS

The Washington metropolitan area pollution problem cannot be permanently corrected in the fact of further metropolitan growth unless:

1. A comprehensive areawide pollution control plan is developed:

[1] See appendix notes.

2. The necessary pollution abatement and control works are constructed by the local jurisdictions in accordance with such comprehensive pollution control plan; and

3. The necessary financing for such work is secured by the various communities.

Within the framework of basic principles discussed in section I, effective pollution abatement and control for the metropolitan area must spring from a coordinating agency which would—

1. Develop a comprehensive overall metropolitan pollution abatement and control plan in cooperation with the local, State, and Federal agencies concerned; and

2. Provide guidance to the local jurisdictions in their implementation of such a pollution abatement and control plan.

A. Coordinating agency

Any effective plan for abating and controlling the area pollution must be based on the established congressional policy of recognizing the primary responsibilities and rights of the States in controlling pollution. The coordinating agency should represent all of the jurisdictions, either directly or through the State agencies primarily concerned. The primary interest of such an agency should be the reduction and elimination of pollution. Preferably the coordinating agency should be an existing interstate agency whose duties and responsibilities are adequately defined and has been authorized by the Federal Government and the State and other jurisdictions concerned. It is essential that the coordinating agency should possess the stature and the administrative and technical ability to guide the local jurisdictions in the development and implementation of a comprehensive metropolitan area pollution control plan.

Inasmuch as the solution of the Washington metropolitan area pollution problem is conditioned by pollution control and water use practices in the Potomac River Basin above Washington, the coordinating agency should have representation from the State agencies controlling such practices in the upper basin. It need not itself have such control since the standby authority of the Public Health Service under the Federal Water Pollution Control Act could be invoked if ever needed to supplement State control action.

The Interstate Commission on the Potomac River Basin appears to be the logical agency for coordinating the development and implementation of a comprehensive metropolitan pollution abatement and control plan for the Washington area. The primary mission of the Commission is to encourage the abatement of pollution in the Potomac Basin and through such encouragement to bring about optimum use of the basin's waters. It was formulated by legislative acts of the four States concerned, the District of Columbia, and Congress. The duties and responsibilities of the Commission are clearly defined and are well understood by the Federal Government and by the State and local jurisdictions. It has worked intimately with all of the Washington area jurisdictions for many years on all aspects of the area pollution problem and also with the various Federal agencies concerned. Although the staff of the Commission would require supplementation, the administrative, legislative, and technical experience and ability residing in the Commission members and present staff are more than ample to enable the Commission to function as an effective area coordinating agency. The Commission members provide broad representation from the legislative, industrial, and technical interests of the State and other jurisdictions in the Potomac Basin. It has ample authority under the provisions of its interstate compact to work directly with the local jurisdictions and to employ or otherwise obtain whatever administrative or technical consultation or assistance may be needed. The Commission could act as the coordinating agency without additional legislation by the Federal Government, the States, or the local jurisdictions. Thus the relinquishment of any existing State or local authority or the assumption of that authority by a Federal or other agency would not be necessary.

It is recognized of course that under Public Law 592, 82d Congress, the National Capital Regional Planning Council was established. This Council was "authorized to adopt and, from time to time, amend, or extend, a general plan for the development of the region, to serve as a general framework or guide of development within which each part of the region may be more precisely planned by the appropriate agency or agencies. * * * As the basis for its plans, the Council shall at all times give consideration to those features of any plan duly adopted by the Commission (National Capital Planning Commission) or any

planning agency appropriate for incorporation in the general plan for the region." It is quite apparent that the Regional Planning Council must attempt to coordinate the efforts of a wide variety of other agencies having interests in the metropolitan area. Hence, the Council could readily accommodate a pollution control plan developed under the guidance of the Potomac River Basin Commission especially since to date it has done no planning of this kind itself. On the other hand, any plan for pollution control developed under the Potomac River Basin Commission's guidance must be fully coordinated with whatever regional planning information can be secured from and through the Regional Council. It is not believed that the proposal made herein conflicts in any way with the purposes or prerogatives of the Regional Planning Council but rather through appropriate coordination between the agencies would be complementary to the work of the Council which has been without funds in any way sufficient to prepare a regional master plan much less undertake any significant concentration on the pollution aspects of such a plan.

B. Development of metropolitan area pollution control plan

The various jurisdictions are even at this time proceeding with extensive construction designed for pollution abatement. These works and those shortly to be undertaken under financing already arranged will greatly improve the condition of the Potomac. It is evident however that construction of these improvements will not provide the final solution of the pollution problem because the potential sources of pollution wil become more numerous as metropolitan growth proceeds. Thus sources of pollution both existing and threatened already are developing in areas not covered by the past analyses and present construction programs of the several local jurisdictions.

The adequacy and suitability of a water supply will ultimately be the only natural factor limiting metropolitan growth. The Potomac now supplies the water needs of over 1 million persons in the area including the District of Columbia, Arlington County, Falls Church, and parts of Fairfax, Montgomery, and Prince Georges Counties. While public supplies are taken from the Patuxent River and Occoquan Creek for use in metropolitan Maryland and Virginia respectively, the ultimate water needs of these areas will undoubtedly exceed the maximum potential of these smaller sources and relief will be sought from the Potomac or its tributaries. Recent and proposed future development in the Potomac Valley above tidewater, both residential and industrial, as with the proposal to construct a major generating plant in Loudoun County, Va., make it clear that what up to now has been a water source of good quality is being threatened with serious degradation from potential waste discharges. Only by protection of the river above the water intakes from pollution and by the maintenance of adequate flow (5)[1] can the development potential of the Washington metropolitan area be realized. Therefore, planning and legislative steps should be taken to preserve from pollution the main water supply of the metropolitan area.

It is now apparent that growth greater than considered in past studies may be expected to accelerate as the central core of the area approaches saturation. The metropolitan community as a whole must be prepared to cope with the growing pollution threat which may be expected to result therefrom. This will require a pollution control plan predicated upon analysis of population growth, land uses, and the development potential and pattern to be expected. Such pollution control plan must evaluate all existing and presently proposed pollution control facilities and must provide for their integration as far as feasible into a coordinated pattern of comprehensive works collectively equal to the foreseeable task.

Information relating to future population growth, land uses, densities of occupancy and the distributions of Federal establishments within the area must be secured from the appropriate agencies in the area directly concerned with such problems including the National Capital Planning Commission and the National Capital Regional Planning Council. Such information is essential for a determination of the potential sources and quantities of wastes.

All factors considered must be subjected to engineering and economic analyses to establish a choice between many alternative solutions. Finally, the desirable dates for the construction of future pollution control works must be coordinated in a timetable which will insure that the facilities are available when

[1] See appendix note.

needed. The costs of such pollution control works and the abilities of the respective local communities to finance such works when needed must also be developed.

The making of any such pollution abatement and control plan is of course beyond the present financial resources of the Interstate Commission on the Potomac River Basin. It is believed, however, that for the reasons stated above this Commission is the agency best suited to undertake the preparation of such a plan and to guide the local communities in their execution of such a plan. The Federal interest in the area as pointed out in section I is sufficient to justify a direct Federal appropriation for the use of the Commission which would be used exclusively to defray the cost of pollution plan preparation and coordination. The Commission therefore recommends early consideration by the Congress of the United States of this proposal.

C. Implementation of metropolitan pollution control plans

Only after objective study and the development of a pollution abatement and control plan will it be possible to determine the cost of bringing the Potomac into suitable condition and maintaining it in such condition. Considering the rapidly rising debt of all communities in the metropolitan area, much of which has been or is being assumed for their current local pollution-abatement programs, it is very probable that future progress will depend entirely upon the ability of these communities to continue to pile debt upon debt as their credit approaches exhaustion.

If local jurisdictions needing costly pollution-control works cannot themselves finance such works then the collective metropolitan welfare will suffer. If combination sanitary and storm-water collection systems are to be replaced to prevent occasional wet weather discharges to the river, vast sums must be expended. It appears logical, therefore, to consider the Federal interest and responsibility in the Washington area pollution problem, as noted in section I, as well as the probable need for Federal financial aid to the communities if an adequate pollution-control program is to be sustained. Any Federal financial assistance within the area should be based on the responsibilities and financial resources of the local jurisdictions, the responsibility of the Federal Government, and the necessity for collective action proceeding on an accelerated and a coordinated basis.

Federal aid could take the form of construction grants and loans or grants only, covering some proportion of the total cost of any given sewage works facility undertaken by a local community. The grant portion in any such instance might well cover as much as 50 percent of the total requirement. If Federal loans are found to be desirable, these should be available only when local jurisdictions cannot borrow from established lending agencies at reasonable rates of interest. Federal loans under these circumstances might become subordinate to the existing indebtedness of the local jurisdictions. Provision of any Federal aid should be conditioned upon the local jurisdiction's adherence to the comprehensive pollution plan and time schedule for the area.

Since the Interstate Commission on the Potomac River Basin does not appear to have authority to receive and disburse Federal funds for construction purposes, it is probable that it could not serve as the agency for the handling of whatever Federal financial aid might be provided for the metropolitan pollution-control program. The United States Public Health Service, however, could serve as the agency for administering Federal aid for works constructed in accordance with the plan developed and maintained by the commission. It is the logical Federal agency to do this, in view of its responsibility under the Federal Water Pollution Control Act for the correction of interstate pollution and its present authorization under that act for making grants and loans to interstate, State, and local agencies for the planning and construction of pollution-abatement works. Furthermore, the Public Health Service is well acquainted with the local problem and with the operation of the commission. It has worked closely with the commission and in the past has provided the commission with a great deal of technical consultative assistance.

III. CONCLUSION

1. The most pressing and immediate need is for a comprehensive areawide pollution-control plan under which all future construction needs of the various jurisdictions and the time schedule for such construction would be developed.

2. Congress should provide Federal financial assistance for developing a comprehensive metropolitanwide plan and should designate the Interstate Commis-

sion on the Potomatic River Basin as the coordinating agency to do this in cooperation with the local jurisdictions and State and Federal agencies concerned.

3. Primary responsibility for construction and operation of waste-treatment works within the framework of a broad metropolitan-area plan should remain with the local communities including the District of Columbia.

4. Federal aid to the local jurisdictions in the form of construction grants may be necessary if waste-treatment works are to be constructed to the extent and at the rate needed. Determination of the type and amount of such aid should follow the completion of a comprehensive metropolitan area pollution-control plan. It should be based upon an evaluation of—

(*a*) The extent of Federal responsibility, and

(*b*) The ability of the local communities to finance the higher degree of waste treatment needed to maintain a clean river for the Nation's Capital.

Such Federal financial aid could most logically be provided through the United States Public Health Service.

The Public Health Service should continue its cooperative support of the Potomatic River Commission and State and local programs. It should be prepared to take enforcement action under the provisions of the Federal water-pollution-control law in the event such a step becomes necessary and is requested by the States.

Implementation of the above recommendations would utilize the existing local, State, interstate, and Federal jurisdictions and agencies to the optimum degree possible and each would operate within its acknowledged sphere of activity. By such coordinated and cooperative action, the Nation's river, the Potomac, would be restored and preserved.

(November 7, 1955.)

APPENDIX TO PROPOSED OVERALL ADMINISTRATIVE AND LEGISLATIVE PLAN FOR CORRECTION OF POTOMAC RIVER POLLUTION IN THE WASHINGTON METROPOLITAN AREA

As amplification, support, or explanation of statements contained in the basic report, the following will be of value:

Note (1)

RÉSUMÉ OF MOST SERIOUS SOURCES OF POLLUTION IN THE IMMEDIATE WASHINGTON METROPOLITAN AREA AND PRESENT LOCAL PROGRESS FOR THEIR CORRECTION

District of Columbia

Situation.—During the month of maximum flow of 1955, the District's primary sewage-treatment plant at Blue Plains removed only 27 percent of the b. o. d. and 49 percent of the suspended solids from an average flow of 218 million gallons per day. This resulted in the delivery of 61.5 tons of b. o. d. daily to the Potomac. Mean annual flows through this plant are 159 million gallons per day, of which about 16 million gallons per day is generated in nearby Maryland communities.

Correction.—Construction of the first half of secondary sewage-treatment facilities at Blue Plains will be started in early 1956 and be completed for the summer of 1958, providing b. o. d. removals of 60 percent and suspended solids removals of 65 percent. Forty-four tons of b. o. d. per day will then be delivered to the river. Construction of the second half of the secondary plant will begin in the summer of 1956 and be completed for service during the summer of 1959. This will provide 80 percent b. o. d. removal and 85 percent suspended solids removal and during a maximum summer month will deliver 22 tons of b. o. d. daily to the river. This plant will treat sewage originating in the District of Columbia as well as sewage originating in the Washington Suburban Sanitary District and delivered to the District's system. Chlorination of effluent now practiced will be continued.

Situation.—The Anacostia River now receives approximately 27 million gallons per day of sewage flows originating in the Washington Suburban Sanitary District. Primary treatment is accorded to approximately 7 million gallons per day of this flow. Low flows cause septic conditions in this stream on many occasions during summer months.

Correction.—As a result of an agreement reached between the sanitary commission and the District of Columbia, all sewage generated in the Anacostia Valley in Maryland will be delivered to the District's sewage system for treatment at Blue Plains. Trunk sewers and pumping station for this purpose are now under construction. Pending completion of the Anacostia Freeway between East Capitol and South Capitol Streets, which coincides with route of Maryland's Anacostia trunk sewer, between these limits Maryland flows will enter the District's Anacostia main interceptor at Blaine Street. This interceptor has adequate dry-weather capacity for anticipated flows from both the District and Maryland. During times of rain the slightly increased flows may be expected to exceed the capacity of the District's sewer and some discharges to the Anacostia River near Blaine Street are to be expected. These will be temporary in character and will not occur upon completion of the Maryland trunk, which will occur in 1958 or 1959.

Situation.—Washington's combined sanitary and storm-water sewers serve approximately one-half its area. There are some 70 points at which relief outlets from this system discharge mixtures of storm water and dilute domestic sewage during times of moderate and heavy rainfall. These empty into the Potomac, Rock Creek, and the Anacostia. Dry-weather flows are intercepted and carried to the sewage-treatment plant. Periodically during months of maximum flow, the undersized B Street and New Jersey Avenue interceptor is overcharged. On these occasions, dry-weather raw sewage flows to the Potomac in substantial quantities have occurred at 27th and G Streets and adjacent to the Water Gate. Obstruction of regulator devices by debris occasionally results in dry-weather discharges from others of the combined sewer overflow outlets.

Correction.—Behavior of the combined system, and remedial measures where defects appear, are now under intensive study by a board of engineers, retained for this purpose by the District of Columbia in July 1954. Board report and recommendations are expected in July 1956. While dry-weather overflows to the river, etc., do not occur during the greater part of the year, the construction of a relief sewer for the B Street and New Jersey Avenue interceptor is scheduled in the District's 10-year program, with work beginning in 1957. Objective will be assured elimination of all dry-weather overflows and reduction in frequency of wet-weather discharges. Divorcement of selected combined system areas in upper Potomac, upper Rock Creek, and Anacostia regions has been accomplished and continuing divorcement work in fringe locations is still in progress as funds permit.

Arlington

Situation.—Arlington County is served by a primary sewage-treatment plant having a designed capacity of 20 million gallons per day. Average annual flows for the past year were 11.26 million gallons per day, from which 72.2 percent suspended solids and 39.4 percent b. o. d. were removed. Of a total county population of 157,000, 149,526 within the county are connected to the sewer system. Approximately 13,000 persons outside the county are also connected to the Arlington system.

Correction.—The present program indicates construction of secondary sewage-treatment facilities may not be completed before 1970; the starting date of construction to be determined primarily by river conditions subsequent to District's plant additions.

Situation.—Raw sewage discharges to the Potomac originating in a portion of the Rosslyn area are approximately 1 percent of the total county sewage flow.

Correction.—Pumping station and force main to convey this sewage into the main system and then to treatment will be constructed during the current year. This will remove all untreated sewage flows originating in Arlington from the river.

Situation.—The effluent from the sewage treatment plant is discharged into Four Mile Run, having an average flow of 18 cubic feet per second. This run also receives substantial quantities of untreated sewage from the Alexandria sewage system. The stream is greatly overloaded, and septic conditions are not infrequent.

Correction.—Intercepting sewers to remove Alexandria sewage from Four Mile Run are under contract. An outfall sewer from the Arlington plant to the Potomac River is currently scheduled to be built sometime between 1970 and 1985. Condition of Four Mile Run subsequent to removal of raw Alexandria sewage may influence outfall construction date.

Fairfax County

Situation.—In the rapidly growing Fairfax area great numbers of homes have depended upon septic tanks for sewage disposal. Many difficulties have ensued with septic tank overflows appearing on the ground surface and finding their ways into streams tributary to the Potomac.

Correction.—Fairfax County is well underway in an extensive sewer-construction program designed to eliminate this septic-tank nuisance and remove such untreated overflows from the natural waters.

Fairfax has completed and now operates a sewage-treatment plant providing 60 to 65 percent b. o. d. removal from sewage generated in the Holmes Run and Black Lick watersheds. The chlorinated plant effluent is discharged to Hunting Creek from the south.

Fairfax is participating with the city of Alexandria in the joint construction of a secondary treatment plant scheduled for completion in 1956, having 18 million gallons per day capacity with expected b. o. d. removals of 80 percent. Major relief construction for overloaded Holmes Run interceptor is included in work already under contract.

To handle sewage generated in watersheds not tributary to the major plants listed above, Fairfax is undertaking early construction of a 0.75 million gallons per day secondary plant in Pimmit Run, 1.25 million gallons per day primary plant on Little Hunting Creek, and 1.67 million gallons per day primary plant on Dogue Creek. County authorities have indicated early design of secondary facilities for the proposed Dogue Creek plant as an outgrowth of local protests.

General.—Within Fairfax County, Fort Belvoir has a primary treatment plant serving approximately 25,000 with no immediate plans for secondary treatment. Elsewhere, Fairfax County has scattered partial treatment facilities, septic tanks, and cesspools not yet served by the public sewer system. The towns of Vienna, Fairfax, and Herndon each operate sewage-treatment plants. The town of Vienna is now taking bids for plant expansion. Expansion of the Herndon plant is now under contemplation. The town of Fairfax within the past 2 years has placed in service a secondary plant having about 90 percent b. o. d. removal; early expansion of this plant is understood to be under consideration.

Alexandria

Situation.—Alexandria has always discharged raw sewage directly into the Potomac and its adjacent tributaries from a number of points. Much of the sewer system is of the combined type.

Correction.—Interceptors and pumping stations now under construction would remove dry weather flows from the Potomac originating in Alexandria. Expenditure of $100,000 is scheduled for separation of some combined sewers. A secondary sewage-treatment plant being jointly financed with Fairfax County is under construction. This has a designed capacity of 18 million gallons per day with 80 percent b. o. d. removal expected. Plant effluent is to be discharged into Hunting Creek which has a natural flow of 1.83 million gallons per day, its capacity to assimilate the load resulting from this effluent is in doubt.

Maryland

Situation.—The most acute pollution problem in the Maryland area is the Anacostia River described above.

Correction.—Corrective steps for this area are described above.

Situation.—The city of Rockville has a population of about 11,500, using a primary treatment plant of only one-quarter the necessary capacity. The effluent and overflow from this enter Cabin John Creek and the effect is apparent in the Potomac.

Correction.—While Rockville has been under orders from the Maryland State Health Department to correct this condition, concrete action has not been taken. Negotiations between the city and the Washington Suburban Sanitary Commission looking toward delivery of Rockville's sewage to the commission's system with eventual treatment by the District at Blue Plains are understood to be in progress. An alternative under consideration by the city is the construction of a complete plant in the Cabin John Valley.

General.—The sewage-treatment plant for the town of Gaithersburg is subjected to periodic overloading by cannery wastes. In several locations in Maryland counties, subdivision are without sewage-disposal facilities. The Washington Suburban Sanitary Commission is undertaking extensive trunk-line construction to serve such areas.

Note (2)

Current pollution abatement programs, Washington metropolitan area, expenditures, 1950–60 only

Jurisdiction	1950-55	1955-60	Total
Alexandria, Va., sanitation authority	[1]	[1]	[2] $8,546,500
Arlington County, Va.	$3,610,000	$1,095,500	4,705,500
District of Columbia	6,059,000	17,911,000	23,970,000
Fairfax County, Va.	1,500,000	{ 2,200,000 / [3] (16,300,000) }	3,700,000
Washington Suburban Sanitary Commission	4,264,000	13,037,000	17,301,000
Total			58,223,000

[1] Work in progress.
[2] $2,380,000 of this expenditure to be reimbursed by Fairfax County from future revenues not listed herein.
[3] While much of this will remove septic-tank seepage from streams, etc., figure is not used in total.

Sizable pollution abatement and control programs are now under way in the Washington metropolitan area. While these extend beyond 1960, in most cases the table above is confined to work to be performed during present decade. These are the result of years of engineering planning with necessary financing for the most part already arranged. Extensive construction is in progress and more is scheduled for the immediate future. The foregoing figures do not include normal service extensions and internal system betterments, but are comprised for the most part of interceptors, trunk sewers, and pumping and sewage treatment facilities. Expenditures of the smaller cities and towns are not included above. Upon completion of work already programed, there should be no dry-weather discharges of raw sewage to the Potomac, and except for Arlington and two proposed small Fairfax plants (for which secondary designs have been authorized) and Fort Belvoir, all sewage discharges to the river will have received from 60 to 80 percent treatment. The bases of design for the Alexandria, present Fairfax, and District plants (the latter to handle Maryland sewage also) make provision for populations expected to be tributary to such plants in 1970 or later. The backlog of acute requirements for pollution-control facilities resulting from recent population expansion will be largely satisfied by these programs.

Note (3)

RECENT THREATS OF SPREADING POLLUTION

It is understood that some ten or a dozen Federal agencies, most of which are presently situated within the District of Columbia, now have under consideration the possibility of relocating their activities to points elsewhere in the metropolitan area. Recognizing that adequate sites are scarce within the developed regions, it appears probable that such agencies when relocating will tend to distribute themselves throughout the generally undeveloped portions of the metropolitan area. The announcement of the Atomic Energy Commission of its selection of a site near Germantown, Md., in the Senaca watershed in a case in point. The selection of a site near Langley, Va., by the Central Intelligence Agency for its new offices further illustrates the trend. With each such installation it must be expected that there will shortly develop a satellite community which together with the Federal establishment itself will generate sewage wastes in quantities requiring special handling and treatment facilities. The announced plans of the Potomac Electric Power Co. to construct a major generating plant along the Potomac in the lower corner of Loudoun County is a further indication of the impending development of what has heretofore been considered the outlying fringe of the metropolitan area. With the construction of any power facility fears have been expressed by property owners on both sides of the Potomac in its vicinity that industrial development may ensue in Maryland as well as Virginia. While the power company itself is considered a threat to the potability of the District's water supply, the evolution of a substantial industrial area in its neighborhood must be viewed as a possible serious menace to the Potomac River from a pollution standpoint.

Subdivisions of various sizes have developed in many parts of Prince Georges and Charles Counties at points remote from existing sewage collection systems. Similarly, the recent application for construction of a sewage treatment plant to serve the proposed subdivision initially called McLean Heights in Fairfax County, Va., indicates the pressures for metropolitan expansion which are now coming into existence.

The types of growth illustrated above are believed to be typical of what must be expected from now on. The piecemeal handling of the wastes from each individual establishment or development can be expected to culminate in a generally chaotic condition where their aggregate effect, in spite of individual sewage treatment, can become not only a menace to the public water supply but so degrade the river as to largely vitiate the beneficial effect to be expected from much of the remedial construction now planned or recently completed elsewhere in the metropolitan area.

Note (4)

EXTRACTS FROM EXISTING LAWS WITH RESPECT TO POLLUTION CONTROL

The Water Pollution Control Commission of the State of Maryland was created in 1947. Extracted from its enabling act is the following:

"(1947 Supp., art. 19A, sec. 30, 1947, ch. 697, sec. 30)

"36. It shall be the duty of the Commission to study, investigate and from time to time recommend ways and means of eliminating from the waters of the State, so far as practicable, all substances and materials which pollute or tend to pollute the same and to recommend methods, as far as practicable, for preventing pollution as defined in Section 34.

"The Commission is hereby authorized to encourage voluntary cooperation by the citizens of the State and by the industries, municipalities, counties, metropolitan districts and the State in restoring, preserving and maintaining the purity of the waters of the State for the greatest benefit of all the people of the State; to coordinate and stimulate the activities of the several State agencies now concerned with water pollution; to enforce existing laws relating to the abatement of pollution of the waters of the State; to supplement and expand existing technical or other water pollution data by study, investigation, research or other means that may be available; to cooperate with, assist and aid other State agencies engaged in assembling, accumulating or developing additional data or information on water pollution; to cooperate with, assist and aid other State agencies in enforcing water pollution laws or regulations; to recommend standards for sewage or waste effluents discharged into the waters of the State; to receive complaints or petitions relating to the pollution or alleged pollution of the waters of the State and to investigate and take such action as hereinafter provided; to conduct hearings, upon due notice, as may be advisable or necessary for the discharge of duties under this subtitle; to issue a special order or orders directing any person in this State causing the pollution of the State waters to secure within the time toward the reduction, control, abatement, and prevention of such pollution; * * *"

The State Water Control Law of Virginia, chapter 2, title 62, Code of Virginia, provides in part as follows:

62–11 "(6) 'Pollution' means the discharge or deposit of sewage, industrial wastes, or other wastes, in such condition, manner, or quantity, as may cause waters of the State to be contaminated, unclean, or impure to such an extent as to make such waters directly or indirectly detrimental to the public health or to the health of animals, fish, or aquatic life; unsuitable with reasonable treatment for use as present or possible future sources of public water supply; or unsuitable for recreational, commercial, industrial, agricultural, or other reasonable uses; provided that the discharge or deposit of sewage, industrial waste or other waste by any owner which from such owner alone would cause no pollution yet, in the aggregate of all such discharge or deposit by other owners in any State waters, causes the same to be polluted is 'pollution' for the terms and purposes of this law;"

66–12 "Control by State as to pollution: No right to continue existing pollution in any State water shall exist nor shall such right be or be deemed to have been acquired by virtue of past or future pollution by any owner. The right

and control of the State in and over all State waters is hereby expressly reserved and reaffirmed."

62–13 "Public policy regarding discharge of sewage or wastes in State waters: The discharge by any owner not having a certificate issued by the Board, of sewage, industrial wastes, or any noxious or deleterious substances into State waters, which is detrimental to the public health, or to animal or aquatic life, or to the uses of such waters for domestic or industrial consumption or for recreation, is hereby declared to be against public policy."

Elsewhere, chapter 2, title 62 of the Code of Virginia creates a State water control board to exercise general supervision over the administration and enforcement of this law and carry out the general purpose of the act.

The Water Pollution Control Act, Public Law 845, 80th Congress, contains the following language:

"SEC. 2. (a) The Surgeon General shall, after careful investigation, and in cooperation with other Federal agencies, with State water pollution agencies and interstate agencies, and with the municipalities and industries involved, prepare or adopt comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof and improving the sanitary conditions of surface and underground waters."

* * * * * * *

"SEC. 2. (d) (1) The pollution of interstate waters in or adjacent to any State or States (whether the matter causing or contributing to such pollution is discharged directly into such waters or reaches such waters after discharge into a tributary of such waters), which endangers the health or welfare of persons in a State other than that in which the discharge originates, is hereby declared to be a public nuisance and subject to abatement as herein provided.

"(2) Whenever the Surgeon General, on the basis of reports, surveys, and studies, finds that any pollution declared to be a public nuisance by paragraph (1) of this subsection is occurring, he shall give formal notification thereof to the person or persons discharging any matter causing or contributing to such pollution and shall advise the water pollution agency or interstate agency of the State or States where such discharge or discharges originate of such notification. This notification may outline recommended remedial measures which are reasonable and equitable in that case and shall specify a reasonable time to secure abatement of the pollution. If action calculated to secure abatement of the pollution within the time specified is not commenced, this failure shall again be brought to the attention of the person or persons discharging the matter and of the water pollution agency or interstate agency of the State or States where such discharge or discharges originate. The notification to such agency may be accompanied by a recommendation that it initiate a suit to abate the pollution in a court of proper jurisdiction.

"(3) If, within a reasonable time after the second notification by the Surgeon General, the person or persons discharging the matter fail to initiate action to abate the pollution or the State water pollution agency or interstate agency fails to initiate a suit to secure abatement, the Federal Security Administrator is authorized to call a public hearing, to be held in or near one or more of the places where the discharge or discharges causing or contributing to such pollution originate, before a board of five or more persons appointed by the Administrator, who may be officers or employees of the Federal Security Agency or of the water pollution agency or interstate agency of the State or States where such discharge or discharges originate (except that at least one of the members of the board shall be a representative of the water pollution agency of the State or States where such discharge or discharges originate and at least one shall be a representative of the Department of Commerce, and not less than a majority of the board shall be persons other than officers or employees of the Federal Security Agency). On the basis of the evidence presented at such hearing the board shall make its recommendations to the Federal Security Administrator concerning the measures, if any, which it finds to be reasonable and equitable to secure abatement of such pollution.

"(4) After affording the person or persons discharging the matter causing or contributing to the pollution reasonable opportunity to comply with the recommendations of the board, the Federal Security Administrator may, with the consent of the water pollution agency (or of any officer or agency authorized to give such consent) of the State or States in which the matter causing or contributing to the pollution is discharged, request the Attorney General to bring a suit on behalf of the United States to secure abatement of the pollution.

"(5) Before or after any suit authorized by paragraph (4) is commenced, any person who is alleged to be discharging matter contributing to the pollution, abatement of which is sought, may, with the consent of the water pollution agency (or of any officer or agency authorized to give such consent) of the State in which such matter is discharged, be joined as a defendant. The Court shall have power to enforce its judgment against any such defendant."

There is now pending in the Congress of the United States a bill known as S. 890 "to extend and strengthen the Water Pollution Control Act" which was passed by the Senate on June 17, 1955, and reported out with amendments by the Committee on Public Works, House of Representatives on July 26, 1955. The standby enforcement authority which would be granted the Surgeon General by the pending bill while a modification of the language quoted above would substitute somewhat less complex procedures to be followed under these circumstances.

The following is extracted from the Code of Maryland with respect to the State board of health:

(An. Code, 1939, sec. 378; 1924, sec. 334; 1912, sec. 275; 1914, ch. 810, sec. 7)

"371. When the State Board of Health finds, upon investigation, that any of the waters of the State are being, or are liable to become, polluted in a way dangerous to health, or so as to be in any way a nuisance, and such condition is due to the fact that there is no, or only a partial, system of public water supply, sewerage or refuse disposal in a certain County, municipality, district, subdivision or locality; or in case absence or incompleteness of a public system of water supply, sewerage or refuse disposal in any County, municipality, district, subdivision or locality is, in the opinion of the State Board of Health, sufficiently prejudicial to the health or comfort of that or any other County, municipality, district, subdivision or locality; then the State Board of Health may issue an order to the effect that a public system of water supply, sewerage or refuse disposal shall be installed and put into operation, or the existing system completed, in that County, municipality, district, subdivision or locality, within a specified time; or the Board may order the installation of such devices or the institution of such methods, and enforce such measures or regulations, as it may deem proper under the circumstances."

(An. Code, 1939, sec. 382; 1924, sec. 338; 1912, sec. 279; 1914, ch. 810, sec. 11)

"375. Whenever the State Board of Health shall find that any of the waters of the State are polluted by wastes from any manufacturing or industrial establishment, in such a way as to be or to be liable to become a menace to the public health or comfort, or whenever the existing method of waste disposal in a manufacturing or industrial establishment is found to be or be liable to become in any way a menace to health or comfort, the State Board of Health shall issue an order requiring the owner of such establishment to cease pollution of the body of water into which the waste is discharged, or to make such alterations in the method of disposing of said waste, as the Board may deem necessary to protect the public health and comfort; and said order shall be complied with within such time as the State Board of Health shall determine."

Note (5)

WATER REQUIREMENTS

Irrigation of farmland and orchards in the Potomac River Basin is growing at a remarkable rate. While no figures are available as to the quantity of water taken from the Potomac River and its tributaries, an agricultural census of acreage under irrigation in Virginia showed an increase from 2,817 acres in 1950 to 22,622 acres in 1953. In 31 Eastern States, supplemental irrigation doubled from 1939 to 1949 and is reported to have been increasing at an even greater rate since. Farm irrigation in Maryland is estimated to be substantial at this time and increasing rapidly. A study area of 24,000 acres of apple orchards in Virginia and West Virginia indicated that irrigation at the rate of 80,000 gallons per minute might be required for optimum growth; this represents over 100 million gallons daily.

While the distribution of current and future irrigation activity within the Potomac River Basin is unknown, it is to be expected that flows within the

river may be materially reduced in the years ahead as a result. Since irrigation is most desirable from a grower's standpoint during the summer, the period of lowest normal river flow, there could ultimately result a dangerous reduction in the quantity of water available for the metropolitan water supply during drought periods.

The lowest flow of record in the Potomac occurred during the summer of 1930. The flow at that time was 506 million gallons per day at Great Falls. Normal maximum day requirements for the Washington water system, including the needs of Arlington County and Falls Church, are estimated to be 334 million gallons per day in 1985 with a potential "national emergency" requirement of 418 million gallons per day. The maximum day requirement for Fairfax County is estimated by Alexander Potter Associates to be 43 million gallons per day in 1980. It is also estimated that the Washington Suburban Sanitary Commission may be required to secure up to 60 million gallons per day from sources other than the Patuxent system. The most likely source for such supplement is the Potomac or one of its tributaries above Great Falls. It can be foreseen that aggregate metropolitan water requirements of some 521 million gallons per day are anticipated probably within the next 35 to 40 years. Such requirement would be slightly greater than the minimum river flow of record. If the practice of supplemental irrigation continues to grow in any material way, it will hasten the time when minimum river flows will become insufficient for public water supply purposes in the metropolitan area. It is evident that within the foreseeable future some form of water impoundment must be adopted in order to insure an adequate supply to the area during periods of low summer flow.

Since the degrading effect of pollution on the river is most acute during low flow periods, a further diminution of flows due to irrigation usage of the river's waters can make pollution effects in the metropolitan area even more acute. The possible adverse effect of upstream irrigation on metropolitan pollution has not been generally recognized.

(October 25, 1955.)

Senator MORSE. Any questions?

Senator BEALL. No questions.

Representative SMITH. No questions.

Senator MORSE. The next witness will be Mr. Oliver Gasch, general counsel of the Interstate Commission of the Potomac River Basin.

STATEMENT OF OLIVER GASCH, GENERAL COUNSEL, INTERSTATE COMMERCE ON THE POTOMAC RIVER BASIN

Mr. GASCH. I appreciate this opportunity of appearing before you, I have prepared a statement which I would like to hand up to you gentlemen and then I will briefly try to tell you what it contains.

Maybe that will be a little better, a little easier for you. As Mr. Tisdale has explained, the Interstate Commission on the Potomac River Basin——

Senator MORSE. The full statement of Mr. Gasch will be printed in the record at this point.

(The document referred to is as follows:)

STATEMENT OF OLIVER GASCH, GENERAL COUNSEL, INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

The proposal of the Potomac Electric Power Co. to construct a steam-generated powerplant at the lower end of Loudoun County, Va., on the Potomac River, and the obligation it has incurred to those who granted it an option and who own approximately 1,500 acres adjoining the proposed site, to cooperate in seeking industrial zoning for that additional area, points up the need and desirability for additional legislation. While some question may exist as to whether this project, as it concerns a powerplant alone, will detrimentally affect the public water system of the metropolitan area, it is clear that if additional industrial facilities are constructed and sanitary sewage is permitted to flow into the river in

conjunction with the flow of heated water from this powerplant, that detrimental effects will be realized at the intake for the public water supply.

Under these circumstances, it is believed that the Congress should consider the advisability of additional legislation. It is proposed first that 40 U. S. C., section 45 and following, which relates to the Washington aqueduct, should be modernized. Section 58 of this title relates to the crime of maliciously making water impure. It was enacted 60 years ago. This section should be supplemented by law authorizing the Chief of Engineers, or his designated representative, to require anyone seeking to construct a facility the effects of which may adversely affect the character and quality of the public water supply of the metropolitan area, to seek permission from him to construct such facility. If the Chief of Engineers, or his designated representative, believes the facts and circumstances of the case warrant a public hearing, he shall make provision therefor and give the applicant an opportunity of demonstrating that his project will not adversely affect the character and quality of the public water supply. At this hearing the Chief of Engineers, or his designated representative, shall be authorized to introduce into the record any evidence that he believes germane to the determination of the issue before him. Upon consideration of the record as a whole, he shall make a determination as to whether to issue the permit. His determination, if adverse to the applicant, shall be subject to court review in the United States District Court for the District of Columbia on the issue of the substantiality of the evidence on the basis of which the application was denied.

While the Interstate Commission on the Potomac River Basin has taken no formal action on this proposal, I have discussed the matter with most of the Commissioners, as well as the district engineer. In principle, such legislation is favored. It is my belief that such legislation would establish an orderly, expeditious, fair and practical method for dealing with this most important issue. It is absolutely necessary that this irreplaceable natural resource be protected for the people of the National Capital and those living in the environs thereof. This is particularly true in view of the fact that within the foreseeable future Maryland and Virginia communities within the environs of the National Capital will have to depend on Potomac water to an ever-increasing degree.

When I appeared before the National Capital Regional Planning Council, I proposed that that organization consider the advisability of supplemental legislation which would require those who propose to establish industrial uses on the Potomac River to obtain zoning permission, not only from the county affected, but from such a regional agency as the National Capital Regional Planning Council, the Interstate Commission on the Potomac River Basin, or some new agency to be established by Congress. When question was raised as to the decision of the Loudoun County Board of Zoning Appeals in granting a use permit to the Potomac Electric Power Co. for the construction of this proposed facility, members of that Board correctly stated that their authority ran only to the question of the local interest of Loudoun County. It is noted that the proposed power facility is located in the extreme corner of the county, so that few in that county would be adversely affected by this industrial development. Downstream landowners, however, on both sides of the river, as well as those in the metropolitan area, dependent upon Potomac water for drinking and domestic purposes could be adversely affected. Legislative machinery to deal with such problems on a regional basis is clearly indicated and recommended.

Mr. GASCH. The Interstate Commission is much concerned about new threats of pollution particularly in the relatively unpolluted upstream stretches of the river.

You gentlemen know the very seriously polluted conditions in the lower river. It is very difficult to do anything about it without the expenditure of a great deal of money.

On the upper river we are trying to keep that river at least as good as it is at the present time. I am not an engineer, gentlemen, and I am not going to attempt to appraise or evaluate the testimony that you gentlemen have heard here this morning. I would say this however, that from what I have heard of the testimony, it seems to me that you have a threat which is above and beyond the mere fact of putting a powerplant on the upper river.

You are going to construct a spur in to bring in substantial amounts of coal. In addition to that you will have the availability of electric power. In spite of what my good friend Jimmie Reilly says about that not being likely to cause industry to come in, I would rather feel that, where a large powerplant was constructed and you have chimneys belching forth smoke, that is necessarily coming from those chimneys, it is going to be much less desirable from a residential standpoint.

The folks up in Loudoun, the zoning board up there if they are approached with other applications to let in industry because you can't sell your land to people who developed it residentially, they are going to act in the best interests of Loudoun County and let industry come in. If you couple industry with its affluence and other waste products with this heated water you will get a situation which will probably adversely affect the drinking supply of the metropolitan area.

I think that is a serious problem, gentlemen, I think it is something that is pretty plain in the future. I would recommend just as seriously as I can, that you gentlemen consider possible legislative corrective action.

What I have in mind in that regard is this: At the present time, section 40 or title 40, United States Code, section 45 and following, deals with the Washington aqueduct and the responsibility of the Chief of Engineers to operate its aqueduct. He is given no modern authority to deal with such a situation as this. In section 58 of that act, adopted probably 60 years ago, it deals simply with the proposition of those who would maliciously make the water impure.

I suggest a modernization of this section whereby if anyone wants to locate an industrial development or an industry in this region upstream from the intake, that they should get the permission of the Chief of Engineers or his designated representatives and upon application to him, if he has any question concerning the possible adverse effect on the water supply of this location of industry, he should hold a hearing, he should invite these people to come in, submit their engineering, or other data for his consideration, he should be authoritated and expected to get data that would advise him, independent data that would advise him as to the character of the development and its effect on the water. If he decides adversely to the applicants, then the applicants should have the right to go into the Federal district court and have a review of the adverse determination on the question of substantiality of the evidence which led him to an adverse conclusion.

I think if that is done, you will have an expeditious, fair, and direct way of dealing with this problem.

As I say, gentlemen, it is not so much just this powerplant and the heating of the water, it is the consequences that very probably will follow with such a development, that concerns the Interstate Commission and frankly is of great concern to me as a lawyer in trying to figure out what you can do about it.

So I would suggest that type of legislation.

Now there is a second type of legislation that I have in mind, which I discussed with the gentlemen who compose the National Capital Regional Planning Council.

At the time Pepco applied to the zoning appeals board of Loudoun County they received what is known as a use permit.

As Mr. Reilly pointed out it is an agricultural area, zoned agriculturally, they got a use permit to put in this powerplant, which is an industrial use and some question was raised, some people thought that was wrong. The officials of the Loudoun County board, quite properly in my opinion, as a lawyer, having some experience with the zoning, said we are limited to the question of what the best interests of Loudoun County require. I think the gentleman was correct. I find no fault for his attitude. But may I suggest this to the committee: The problem is bigger than the best interests of a single county along the river. It so happens that this particular powerplant would be located in the lower section of Loudoun County, so that even if persons living on the river in Loudoun County might have substantial residential developments, it would not hurt them, because the water flows downstream. It might, however, affect adversely people in Fairfax County, downstream, or Montgomery County across the river.

It might have a very definite adverse effect on the people of Metropolitan Washington who use the river water for drinking and domestic purposes.

I would recommend to you gentlemen that you consider the advisability of further legislation which would have the effect of giving consideration on an interstate basis or regional basis of such efforts as this to rezone areas on the river. Because while today it is Loudoun County that we are complaining about, tomorrow it might be some other county and I think everybody is entitled to be heard and to be heard by a forum composed not only of people who live in one county but the people who live in all the areas.

That would be my second recommendation, sir.

I greatly appreciate, gentlemen, the opportunity of appearing before you. And I feel that if this additional legislation can be given consideration, we will have made some progress along the lines of keeping the river clean.

Senator MORSE. Senator Beall?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. Just one question, Mr. Gasch, dealing with this hypothetical. It seems clear that Pepco has to build a generating plant someplace to meet the power needs of the area.

Mr. GASCH. Certainly electric power is needed as well as water is needed. That is one of the necessities of the economic life of our area.

Senator MORSE. Have you considered this matter sufficiently to have reached any personal conclusion as to other sites where you think this plant could be located economically and engineeringly feasible to the company?

Mr. GASCH. I don't know that I am competent to pass on that. As I say, I have no engineering training. But I would say offhand that a site downstream from Washington, located a sufficient distance from Washington, so that you would take care of your dispersal angle, would be a better answer than locating it in the relatively unpolluted upstream area which you need for water supply, present and future.

Senator MORSE. The testimony I think is pretty clear today that one of the considerations that has to be given to the location of such a plant is transportation, availability of transportation facilities for the coal.

Mr. GASCH. Yes, sir.

Senator MORSE. Maybe by means of a railroad. No one has said anything in the hearing, and I know nothing about it from the standpoint of its feasibility, but I know where the railroads run in this area, and you have stressed in your testimony the industrialization problem that arises.

Mr. GASCH. Yes, sir.

Senator MORSE. There is a railroad up in the Point of Rocks area, and I assume some slight industrialization in that area. I just mention that in passing.

Senator BEALL. One of the best in the country.

Senator MORSE. Did I get over into your territory? It is a little bit on two sides of the river even there.

I make this comment only because I interpret your statement to mean that you thought that consideration should be given to legislation that affects industrialization. Your testimony was that the Loudoun Zoning Board was limited to what is best for Loudoun County and you have prayed the committee to consider this on a regional standpoint and try to determine where the best location would be from the standpoint of the benefits to the whole area?

Mr. GASCH. Yes, sir.

Senator MORSE. Is that a fair interpretation?

Mr. GASCH. Yes, sir.

Senator MORSE. I have nothing further.

Senator BEALL. No questions.

Mr. GASCH. Thank you.

Senator MORSE. The next witness is Mr. J. Grahame Walker, president of Montgomery County Council.

STATEMENT OF J. GRAHAME WALKER, PRESIDENT, MONTGOMERY COUNTY COUNCIL

Senator BEALL. Mr. Chairman, there are other members of the Montgomery County Council here. Will you ask the spokesman to introduce them?

Senator MORSE. Mr. Walker, would you present any other members of your council that you want to present to the committee?

Mr. WALKER. There is no other member of the council here, Mr. Chairman.

Senator MORSE. Very well.

Mr. WALKER. The county manager, Mr. Melvin Reese, is here.

Mr. Chairman and gentlemen of the committee, I have been asked to make this brief statement on behalf of the Montgomery County Council.

Montgomery County, Md., is vitally interested in the stream pollution problems now being examined by your committee. It is the judgment of the Montgomery County Council that the basic problems of land use and water resources parallel those of stream pollution.

The overall land use determinations within the entire Potomac Basin area have been the concern of the nine planning and control agencies—Federal, regional, State, and local. The Congress assigned to the National Capital Regional Planning Council the task of examining both land use and water resources.

Montgomery County participates in the deliberations of this council and stands ready to give consideration and effectuation to sound policies through our own political and legislative powers.

Our immediate concern is the potential development of upper Montgomery County. We are presently engaged in the drafting of a master zoning plan which will regulate land use in this area. Likewise, the Washington Suburban Sanitary Commission is studying the problem of water supply during the next 5 years, and reported only in September on a projected expansion plan. Montgomery County today has a population of nearly 300,000 people, and in the next 5 years we should have about a half million inhabitants needing water for homes, agriculture, and industry.

We call the attention of the Congress to the general concern of all of the planning agencies, including the United States Army Corps of Engineers, that the Potomac watershed problem must be approached in its entirety.

We recognize the excellent work of the Army Corps of Engineers in long-range planning, and in recent efforts toward coordinating the thinking of all the agencies mentioned earlier. We are, however, asking this committee to urge the Corps of Engineers to make an early determination as to the location of dam construction and impounding lakes and reservoirs to guarantee a constant year-round supply of water for all future use of all our urban populations, our agriculture, and for much needed industrial expansion. When these facts are determined and a timetable agreed upon, we can effectively attack the pollution problem. Until such determinations are known all commercial and industrial development in the political and legislative jurisdictions within the entire area are at a standstill.

A future good clean water supply for an expanding irrigational use in agriculture, for thousands of new homes, and for industrial expansion deserves the highest priority.

That concludes the statement, Mr. Chairman.

Senator MORSE. Thank you very much. Senator Beall?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. No questions.

Anything further?

Does the manager of the county wish to make a statement?

Mr. REESE. No, sir.

Senator MORSE. The next witness will be Mr. Paul Watt, Executive Director of National Capital Regional Planning Council.

STATEMENT BY PAUL C. WATT, DIRECTOR, NATIONAL CAPITAL REGIONAL PLANNING COUNCIL

Mr. WATT. Mr. Chairman, I am Paul C. Watt, Director of the National Capital Regional Planning Council appearing before you in behalf of Mr. Max S. Wehrly, Chairman, who is out of town today and unable to appear.

The National Capital Regional Planning Council, established by Public Law 592, represents the planning agencies of the National Capital region. The National Capital region, with an area of 2,004

square miles and a population now estimated at 1,850,000, includes the District of Columbia, Montgomery and Prince Georges Counties in Maryland and Arlington, Fairfax, Loudoun, and Prince William Counties in Virginia, as well as the cities of Alexandria and Falls Church. The Regional Council is charged with adopting a general development plan for the National Capital region to serve as a general framework or guide of development within which each part of the region may be more precisely planned by the appropriate local planning agencies.

These are such agencies as Mr. Walker has just referred to, of which he represents one group.

The Regional Council wishes to emphasize to this committee that they view the proposed installation of the Potomac Electric Power Co. as a regional planning problem of great significance because of its far-reaching effects upon not just any individual jurisdiction in which it may be located, but on the entire metropolitan area. This is particularly true in relation to land-use policy and area water-supply requirements, both integral parts of the regional plan, not to mention the power needs of the region.

The Regional Council is now well underway in the preparation of the general regional development plan for the region. Population, economic, and land-use data are being collected, evaluated, and projected as a basis for recommending the future general land-use pattern for the region.

This land-use pattern will indicate future residential, commercial, industrial, public, and recreation areas to insure an orderly and balanced growth of the region. An installation of the proportions of this proposed plant must be adapted to this overall pattern on a regional basis, as well as the detailed plan of the local jurisdiction.

The possibilities of unlimited industrial expansion adjacent to such a development cannot be minimized.

The Regional Council is cognizant of the vital role of water supply as it relates to the National Capital region and has joined with the National Capital Planning Commission in appointing a joint committee on water supply and sewage disposal to work with Federal, State, and local agencies to determine the long-range water and sewer requirements for the region.

This committee as Colonel Adams testified was as a result of earlier meetings with the Corps of Engineers as well as the interstate basin people and other independent local and State agencies.

Ultimately, a master plan for providing these needs will be recommended. The relationship of this proposed plant to the provision and safeguarding of an adequate water supply also cannot be minimized.

The Regional Council is of the opinion that there are not now available sufficient factual data, particularly in relation to long-range water-supply requirements, to determine conclusively the effect the proposed installation might have on the water supply.

I think I must indicate that after hearing much of this testimony today, we would have to temper that remark but it was the feeling of the Council at the time this was prepared that much of this data was still being put into a form to be presented.

The engineers are making additional studies bringing forward the facts. The Council further feels that additional engineering data

should be made available by the electric power officials corroborating their recommendations for locating facilities of the type provided.

In reference to that the feeling was we still do not know some of the needed factual data to say whether a plant of this type should be further upstream or could or could not be further downstream. We felt that some of those things should be pointed out from the factual standpoint.

For these reasons, the Regional Council has not taken action relative to this project.

The Regional Council emphasizes that both the water-supply needs and power needs are important in their own right and one should not be sacrificed in relation to the other.

The Council hopes that this committee will recognize the regional significance of this project and recommend means for bringing out all the facts on both sides, so that their needs may be coordinated.

This will require careful, considerate judgment instead of a hasty decision that could have unforetold effect on the future development of our Nation's Capital.

Senator MORSE. Senator Beall?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. No questions. Thank you very much.

I wish to have inserted in the record at this point a letter I have received from Mr. Wilson Compton, Seneca Farms, Herndon, Va., presenting his point of view in regard to the effects of the location of the Pepco plant in the area that adjoins his farm.

(The document referred to is as follows:)

NEW YORK 17, N. Y., *October 18, 1955.*

HON. WAYNE MORSE,
Senate Office Building, Washington, D. C.

MY DEAR SENATOR: I have taken note for some weeks of your interest in the Potomac River matter involving the recent proposal of the Potomac Electric & Power Co.

As you will see from the enclosure my farm, including several hundred acres of bottomland, is immediately adjacent downstream to the proposed site selected by the power company.

The letter to Mr. Cox, whom I personally do not know, contains a suggestion which I hope will have the consideration of your committee when it reaches the point of "shouldering arms."

Sincerely yours,

WILSON COMPTON.

SENECA FARMS,
Herndon, Va., October 15, 1955.

Mr. WILLIAM J. COX,
Chairman, Committee on Potomac River Pollution,
National Capital Regional Planning Council,
Leesburg, Va.

DEAR SIR: It is my understanding that a representative committee under your chairmanship is undertaking an investigation of important aspects of the pending proposal of the Potomac Electric & Power Co. to build a large steam plant on the Potomac River in Loudoun County. That is an important proposal. All pertinent aspects of it no doubt will be given consideration.

I am not now a resident of Virginia. But I have looked forward to permanent resumption within a few years of residence in Loudoun County. For nearly 20 years Mrs. Compton and I have owned lands, with about 2½

miles of Potomac River frontage, immediately adjacent, downstream, to the tract now proposed by the power company as the site for its new plant. This farm, known as Seneca Farms, is I believe generally regarded as one of the best farms in northern Virginia. The heart of the farm is, of course, in its extensive river bottom lands.

I am well aware, however, of the long-time public interest in the water-storage possibilities of this area. For years I have been given to understand that eventually the middle Potomac Valley should be used primarily for permanent water storage as an assurance of water supply to the National Capital. Seneca Farms has between 500 and 600 acres of bottom land which I presume would be sought for incorporation in any such reservoir at reasonable levels of water storage in that area.

Now comes the proposal of the power company, as I understand it, to build a large plant at a level near the present flood level of the river in the area of Seneca Lake, i. e., at about 200 feet elevation. I presume there are technical or economic reasons for this proposal. If such a plant were built and, as indicated by its sponsors, about $100 million invested in it, the use of the river bottom in that general area as a storage reservoir, if not precluded, would apparently be made unreasonably expensive.

There have been in connection with this project many arguments over water purification; water heating and encouragement to growth of algae; over prospective railroad crossings of the Potomac River; over threatened creeping industrial development in areas of Loudoun County now zoned as residential or at least noncommercial; over the extent of powers and jurisdiction of the Loudoun County Board of Zoning Appeals by permit to alter the nature of occupancy of the Potomac Valley. These are important and no doubt will have appropriate consideration.

I hope the middle Potomac Valley will not be industrialized. If it is I will of course ask that my own lands also be included in the zoning permitting industrial and commercial development. Manifestly it would be absurd to encourage commercial development in the area of the power company's project and try to avoid it in the remainder of the far corner of the county immediately adjacent to it. I, of course, hope that we may be enabled to continue to operate Seneca Farms as it is now being operated, as a stock farm and for residential purposes.

But the crucial question would seem to be: Is the ultimate use of the middle Potomac Valley to be primarily for water storage or for industry? The other issues which right now seem to be generating heat rather than light cannot be reasonably determined without a determination of this basic issue. Whether the proposed powerplant should in any circumstances be built in this area is an important and obviously a controversial question. Whether it should be built in a location, in a manner, or at an elevation which will preclude the ultimate use of this area for water storage may be an even more important question.

The steam powerplant proposed by the Potomac Electric & Power Co. for the south bank of Seneca Lake, if built, may easily predetermine the future use of the middle Potomac. The public hearing recently conducted by the Loudoun County Board of Zoning Appeals in Leesburg threw little light on these questions. Nor did it give any reason for assurance that consideration is being given to any serious objectives other than the prospective addition to the Loudoun County tax rolls of a large industrial taxpaying property—important as that may be.

I wonder whether a blunder is about to be made—a blunder which if it is a blunder, may be a costly one not only to the national capital area but to the whole country which directly or indirectly would have to pay the bill. I hope that you and the members of your committee and of the National Capital Regional Planning Council will look into these aspects of the matters before you.

Yours sincerely,

WILSON COMPTON.

Senator MORSE. I would also like to have inserted at this point in the record a letter received from Mr. S. E. Wiseman of the American Toll Ways Authority setting forth a brief statement and containing some data presenting his point of view in regard to this particular issue.

(The document referred to is as follows:)

AMERICAN TOLL WAYS AUTHORITY,
Washington 13, D. C., November 10, 1955.

Hon. Senator WAYNE LYMAN MORSE,
Chairman, Senate District Subcommittee,
Washington, D. C.

DEAR SENATOR MORSE: First, we want to commend the Senate District Subcommittee and you personally for your alertness in having the preliminary hearing set for today to evaluate the controversy flowing from the Potomac Electric Power Co.'s plans to build a powerplant on the Potomac River in Loudoun County, Va.

One of the main purposes of our authority is to dam-bridge rivers and adapt the toll traffic ways to impound waters for populated areas. It just happens that for years we have decided on a site near the proposed location of the powerplant as the exact area where our best thinkers have recommended dam-bridge crossings for the New Jersey, Miami, and Frisco Traffic Ways. Of necessity the ways must skirt the Metropolitan Capital to eliminate the congested traffic here and at the same time relieve the urgent need for more bridges. Attached are enclosures for the record.

This proposed dam-bridge will be built by compact action of the States of Maryland and Virginia and in compliance with the laws of the Congress and the needs of the people of the Potomac River Basin, so that Washington and the basin areas can use the same source of water thus eliminating the urgent and pressing need for water in the outlying basin counties.

By extensive excavation to obtain filling earth for the fill in Loudoun County for dam-bridge at proposed crossing, an extensive pool can be constructed and used to store the waste and heated water after it is used from the dam-pool by the generating plant. This engineering feat will eliminate any possibility of river pollution except in excessive floodwaters when any possible pollution would promptly pass down river water sources of supply. The temperature potential would be eliminated in cold floodwaters.

The powerplant at this proposed location would serve a twofold public service for then the plant can pump the water to Fairfax where a water bonds issue was voted down yesterday. Water mains between the ways are vitally indicated through the Nation as more water is needed each year.

In conclusion, we must add that the toll traffic ways through Virginia and Maryland will give each State a wonderful opportunity to acquire industries as the awakened industrialists want to locate their new plants on the toll ways.

Be assured we offer every help for the Potomac Basin development should be a model for the Nation that other basin areas will want to follow.

Yours very truly,

S. E. WISEMAN.

[From the Omaha World-Herald, March 15, 1955]

TOLL HIGHWAYS NET PROPOSED—LOUISVILLE SUGGESTED AS HUB

WASHINGTON (Associated Press).—A nationwide network of toll highways was proposed to Congress Monday. Under the plan, the network would be centered at Louisville, Ky., because "its meridian pierces the heart of North America."

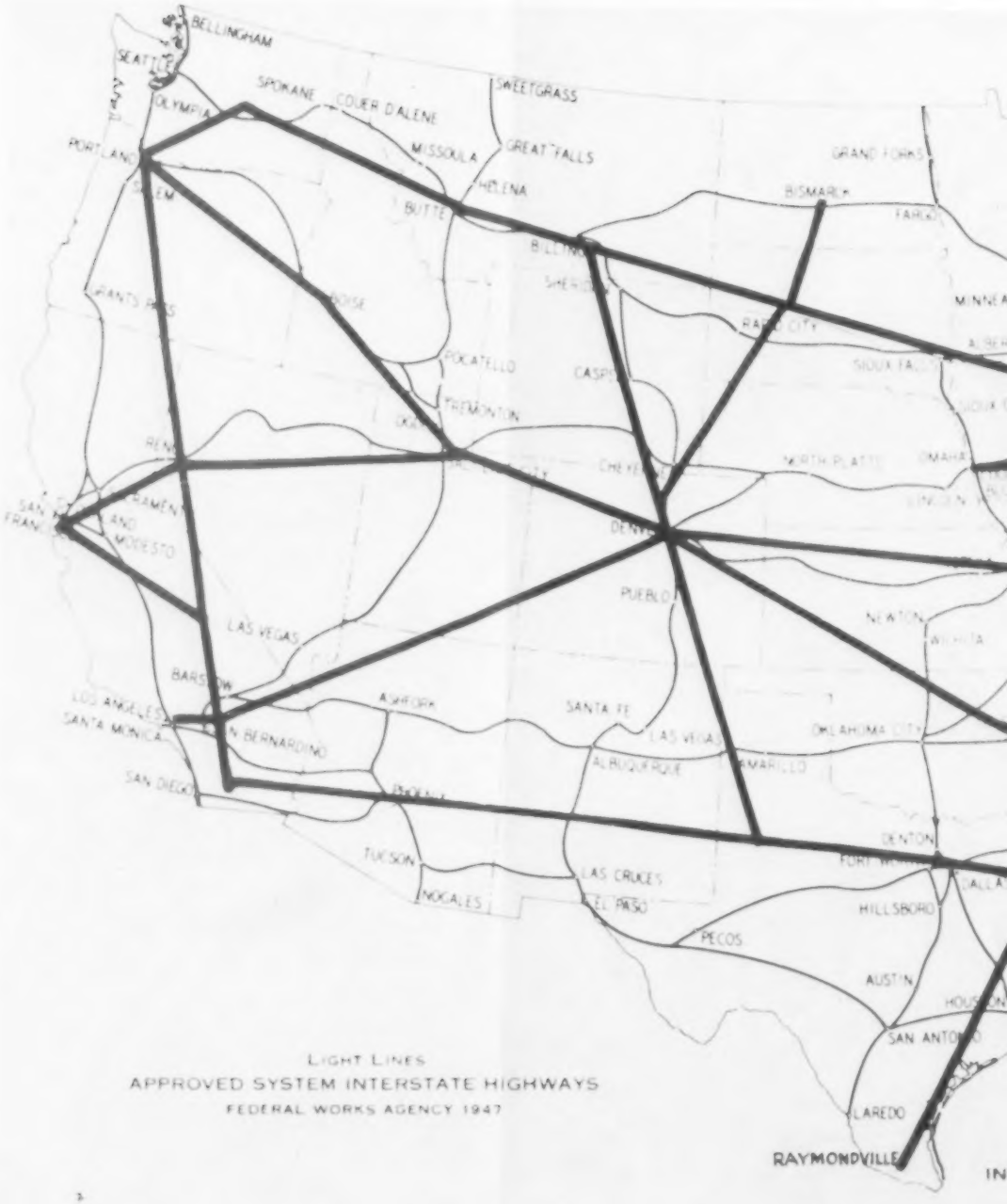
S. E. Wiseman, executive director of the American Toll Ways Authority, said also that the proposed toll network should converge on Louisville because that city is at "the population center of North America."

DIFFER WITH CLAY

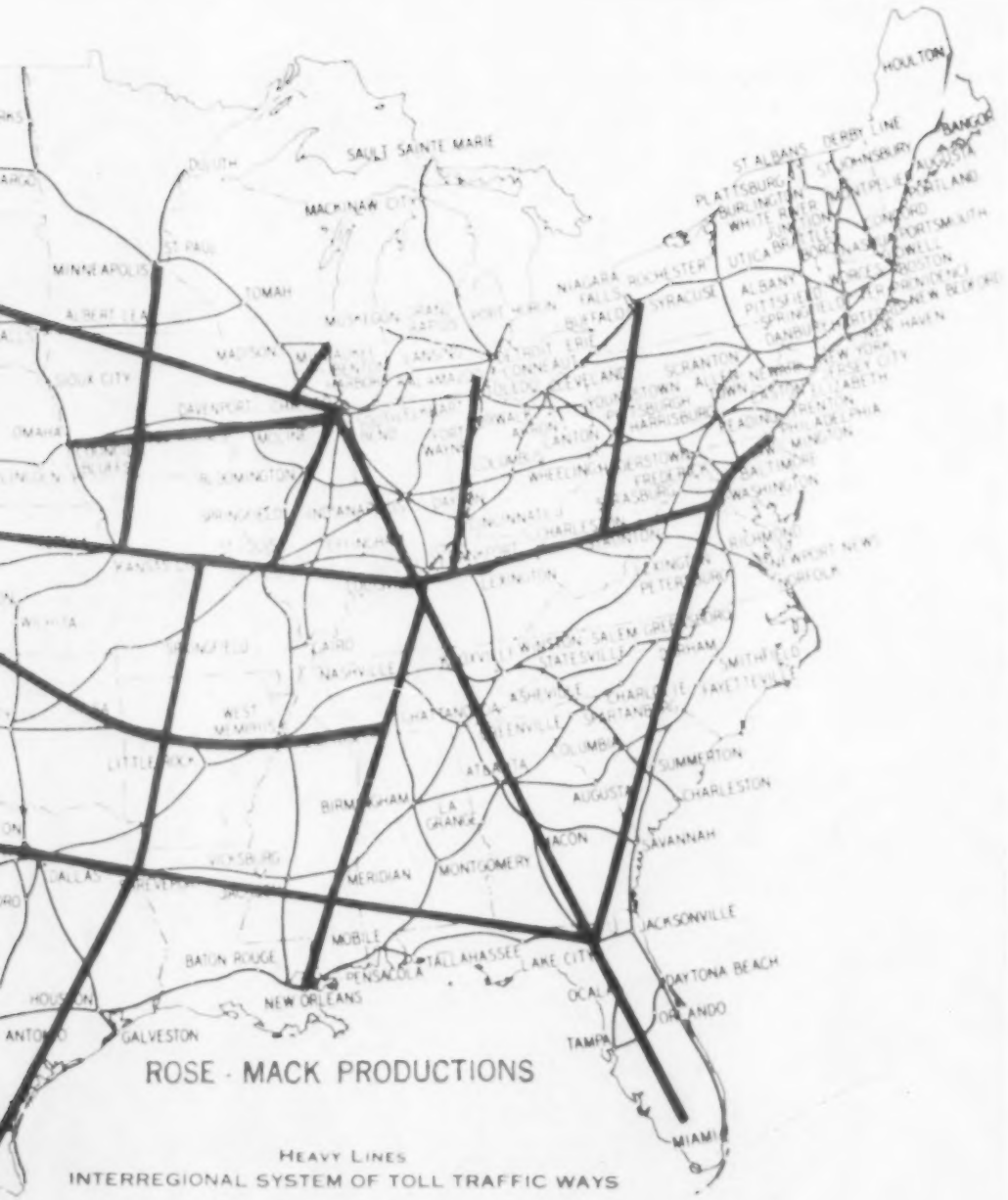
Mr. Wiseman's proposal marked the first time in nearly a month of hearings that the Senate Public Roads Subcommittee has heard a suggestion for a national system of toll highways.

Gen. Lucius D. Clay, author of President Eisenhower's multi-million-dollar highway program, recommended that toll roads be part of a projected system of 40,000 miles in cross-country superhighways.

But General Clay said he was opposed to toll financing as such and that he didn't think it would be feasible to set up toll roads on vast stretches of the country where highway travel is not too great.



LIGHT LINES
APPROVED SYSTEM INTERSTATE HIGHWAYS
FEDERAL WORKS AGENCY 1947



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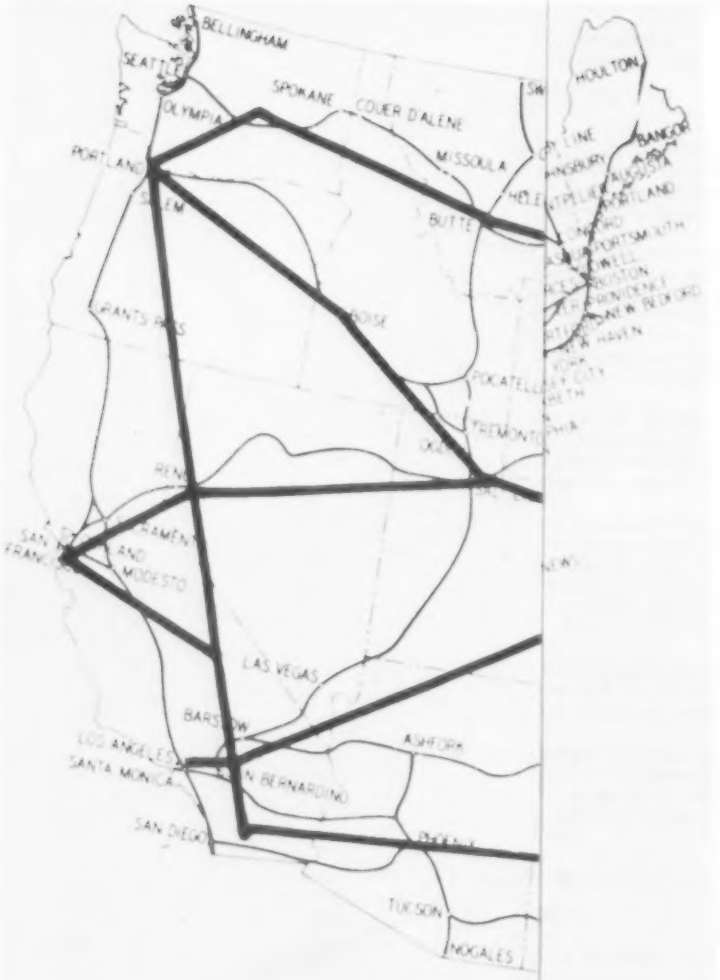

LIGHT LINES
APPROVED SYSTEM INTERSTATE H
FEDERAL WORKS AGENCY 1947

(Face p. 105)

CITES DEFENSE VALUE

Mr. Wiseman agreed that there were areas where toll roads might not be self-liquidating but that "the reserve wealth of the Nation can readily amortize the bonds by grants-in-aid as a national-defense apportionment."

He stressed the defense values of his toll proposal, as did Mr. Eisenhower in outlining his administration's 10-year roadbuilding program.

Senator MORSE. I would like to insert at this point in the record a letter received from the Izaak Walton League of America signed by Roger M. Cole.

(The document referred to is as follows:)

IZAAK WALTON LEAGUE OF AMERICA,
BETHESDA-CHEVY CHASE CHAPTER,
Bethesda, Md., November 6, 1955.

Senator WAYNE MORSE,
Chairman, Senate Subcommittee on District Affairs,
Senate Office Building, Washington, D. C.

DEAR SIR: The Bethesda-Chevy Chase (Md.) Chapter, Izaak Walton League of America, wishes to place on the record of your committee its oposition to the erection of the proposed Potomac Electric Power Co. steam generating plant on the Potomac River in Loudoun County, Va. The Maryland division of the league is already on record in opposition to this proposal. In addition, this chapter, as well as the Silver Spring, Potomac, and Rockville chapters has expressed to the Montgomery County Council its disapproval of moves to locate the proposed plant on the Maryland bank of the Potomac.

We feel that any location on the Potomac River close above Washington, particularly in Montgomery County or at a corresponding location in Virginia, cannot help but be detrimental in a number of ways. It is quite likely that increased water temperatures will add to algae growth and to the problems of organic pollution, thus augmenting the difficulties of the district engineers in assuring a potable water supply for Washington and environs. Increased temperatures, particularly in times of low water in summer, will also undoubtedly result in killing of fish: Witness the massive fish kill only this past summer in the vicinity of Seneca Creek, even under normal conditions. Furthermore, Pepco appears committed to a policy of fostering further industrialization of the Loudoun County area, and might be expected to do the same if located in Maryland. Such industrialization, however light at first, could only result in the ultimate destruction of the recreational values of the only easily accessible and relatively unpolluted slack-water section of the river nearby—namely, the area for several miles above the Seneca Dam. Many people now enjoy boating, hunting, fishing, or walking and nature study in this area and have a right to expect to continue to do so.

Most important, however, in prospect for the future may be the anticipated effects of industrialization on the state of the river water. Pollution by silt from poor management of small watersheds is already common throughout the Potomac below Washington, the tremendous load of untreated or semitreated sewage has at last begun to receive attention, and long-range planning for its abatement is in view. Do we wish, then, in a few years to add upstream the further burden of chemical and more domestic wastes from industrial plants? Consider also the very real possibility in the near future of nuclear reactors as sources of power; conversion to such by Pepco, if located upstream, would then add the cumulative hazard of radioactivity to the other pollution loads.

This chapter, then, urges that your committee seriously consider the long-range effects of the entering wedge of industrialization, as exemplified by the proposed Pepco plant, on the future state of the Potomac River close upstream from Washington. Any tax amelioration accruing to the residents of Loudoun or Montgomery Counties will, in the long run, be a massive price to pay for the loss of good residential areas, of wholesome outdoor recreational opportunities, of potable water, and of good conservation practices. We agree with the suggestion of the Interstate Commission on the Potomac River Basin that the proper location for the proposed plant is downstream from Washington.

Sincerely yours,

(Signed) Roger M. Cole,
(Typed) ROGER M. COLE, M. D.,
President.

Senator MORSE. These are all the witnesses that were listed for testimony.

Are there any other witnesses that have any statements they wish to volunteer?

Could you step forward, please?

What is your name?

STATEMENT OF LAWRENCE M. FISHER, GARRETT PARK, MD.

Mr. FISHER. My name is Lawrence M. Fisher.

Senator MORSE. What are your qualifications, Mr. Fisher?

Mr. FISHER. I am senior sanitary engineer director of the Public Health Service, retired. I am chairman of the committee on sanitation and public health of the Montgomery County Civic Federation, and I was the chairman of the advisory health committee to the Montgomery County Health Department.

Senator MORSE. Do you have a prepared statement?

Mr. FISHER. Yes; I do.

Senator MORSE. How long is it?

Mr. FISHER. Two pages.

Senator MORSE. Any objection? Go ahead.

Mr. FISHER. I make the following statement on my own responsibility, since the above-mentioned organizations have taken no action, as far as I am aware, on the proposed construction of a powerplant on the Potomac River above Great Falls:

The operation of a powerplant, which would raise the temperature of the water in the Potomac River appreciably at Great Falls at certain times, would in all probability be undesirable in the following respects:

(*a*) In summertime, when the river flow is low and when a drink of cool water is most welcome, the public water supply would be made less desirable and less palatable because of the increased temperature at which it would be served to many water drinkers. The Potomac Electric Power Co. would be in a position to benefit from this situation financially because of the increased demand for refrigerated water which might logically result from such a situation.

(*b*) A cool public water supply is in general a greater asset to a community than a warm supply; e. g., Hamilton County, Ohio, has attracted many industries because of the large quantity of cool ground water available at low cost. Raising the temperature of the public water supply, therefore, may be regarded as destroying a portion of a natural community resource.

Mr. Tisdale has already testified to that. I will not go over that.

Senator MORSE. Thank you very much.

Any questions?

Senator BEALL. No questions.

Senator MORSE. Judge Smith?

Representative SMITH. No questions.

Senator MORSE. The Chair now announces that the record of this hearing will be kept open until next Monday at 5 p. m. Any material that any of the witnesses today wish to submit for the record, any material that witnesses that have not been called upon and may wish to submit for the record should be submitted to the counsel of the com-

mittee by 5 p. m. Monday, who in turn will submit the material to the members of the subcommittee for final decision as to its inclusion in the record.

I wish to make clear, however, that any relevant information and material, data or memorandums, will be included in the final record.

The hearing is now closed.

But in closing it I want to say to you, Judge Smith, that we deeply appreciate the courtesy of your attendance and the help you have been to the committee.

Representative SMITH. Thank you very much for allowing me to participate.

Senator MORSE. Very glad to have you. To my colleague from Maryland, I am glad to serve with you on any committee.

Senator BEALL. It is like old times being on with Judge Smith.

Senator MORSE. I thought you were going to say it is like old times with me.

Senator BEALL. You too. We have been on District matters together before. You and I have always gotten along very well.

Senator MORSE. Thank you. I will meet with you next week after the record is closed.

The meeting is finally closed.

(Whereupon, at 4 p. m., the hearings were closed.)

APPENDIX

POTOMAC ELECTRIC POWER CO.,
Washington 4, D. C., November 14, 1955.

Re November 10, 1955, hearing before Special Subcommittee To Investigate the Proposal of Potomac Electric Power Co. To Erect a Steam Plant on the Potomac River in Loudoun County, Va.

Hon. WAYNE MORSE,
Chairman, Special Subcommittee, Senate, District of Columbia,
The Capitol, Washington, D. C.

DEAR SENATOR MORSE: Pursuant to permission granted at the close of the hearing on November 10, 1955, for the filing of supplemental material for the record, we transmit herewith a copy of a report which Pepco under date of October 7, 1955, transmitted to Col. Ray Adams, Corps of Engineers, United States Army, and which was referred to in the testimony of Colonel Adams and others at the hearing.

We know that the members of the subcommittee noted that the testimony of Colonel Adams and the experts who testified on behalf of the Corps of Engineers, as well as the experts who appeared on behalf of the company, fully confirmed the original considered judgment of Pepco that the construction of the proposed plant at the Loudoun County site would have no adverse effect on the Potomac River or the water supply for the District of Columbia and surrounding areas.

From testimony presented by the Corps of Engineers before your subcommittee, we recognize that our proposed plant site in Loudoun County would be flooded if the River Bend Dam was ever constructed. In fact we note from report of Chief of Engineers, United States Army (H. Doc. No. 622, p. 92) that the reservoir of the River Bend Dam, "full to the top of the lowest spillway gates at elevation 235, would inundate about 28,300 acres (exclusive of river channel), of which about 36 percent is wooded. Alterations would be required to 13.3 miles of highways and to 8.7 miles of railroad."

On page 93 of this same document, the following statement is made: "An elevation of 235 was selected as the most economical, considering the limitations imposed on the project by the elevation of the existing railroad yards at Brunswick, Md., upstream." We point out that the river mileage between the River Bend Dam and Brunswick is approximately 37 miles.

It is our understanding that Colonel Adams has agreed that the Corps of Engineers would have no objection to Pepco locating a steam-generating station in the reservoir or forebay area of the River Bend Dam or any other dams which they might construct, provided, of course, that the steam station is located far enough away from any city water intake so as not to create a water temperature problem.

Since there is no controversy with respect to the urgent need for additional electric generating facilities in the area served by Pepco, the subcommittee can readily understand our desire to have the question of site determined at the earliest possible date. It is imperative that the needed facilities be constructed and in operation not later than the spring of 1959 which means that engineering and purchase of equipment must begin in the first quarter of 1956.

In connection with the testimony that the construction of the Pepco plant at the Loudoun County site would attract other industries to the area, we point out the construction of Pepco's plants at Buzzard Point, D. C., in 1932–33 and at Alexandria, Va., in 1947–48, did not result in any industrial development in those areas. In any event, as the testimony at the hearing showed, only certain types of industries might create water problems; and the question of which industries might be permitted to be constructed and operated is within the province of the appropriate governmental authorities.

After we have more fully studied and analyzed the record of the hearing, particularly data submitted since the close of the hearing, we hope that we may

have the opportunity to confer with your staff, and submit promptly any analysis or other response which might be required with respect to such supplemental material. And, of course, our personnel and facilities are fully available to the subcommittee and its staff for conference and to furnish any additional desired data.

Very truly yours,

G. BISSET, *Senior Vice President.*

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA,
Philadelphia 3, Pa., November 15, 1955.

Mr. L. W. CADWALLADER,
Potomac Power & Electric Co.,
Washington, D. C.

DEAR MR. CADWALLADER: The question has been raised as to what effect the operation of Pepco will have on algae and fish life in the Potomac River. There are three possible effects to be considered:

1. Mechanical injury through intakes.
2. Effects of inorganic and organic wastes.
3. Effects of temperature.

It is my understanding that in design and construction of the plant, facilities will be installed which will greatly reduce any possibility of mechanical injury to a minimum. There are ways to do this and it has been effectively done by powerplants in other rivers in the country.

I understand that all inorganic and organic wastes are to be rigidly controlled and will either not reach the river or reach it in such small amounts that they will not be toxic or raise to any measurable effect the organic load of the river.

The effect of Pepco on the temperature of the river near the point of entrance of the effluent will be to raise the temperature 7° F. if thorough mixing occurs. If the water does not mix it will raise the temperature of the river on one side 14° F. The only possible trouble would result during low flow and hot weather. Taking the worst conditions as the base of calculations we get the following results.

Assumption: During July and August the water temperature reaches 77° F. to 78.8° F. An additional rise of 7° F. would result in a temperature of 84° F. to 85.8° F. However, if the water did not mix, one side of the stream would have a normal temperature. The other side would have a temperature of 91° F. or 92.8° F.

In our laboratory at the Academy of Natural Sciences of Philadelphia, Dr. John Cairns and Dr. Arthur Scheier have carried out numerous tests on the effect of rising temperature on bluegills, channel catfish, and bullheads. Since the bluegills are very similar to bass in their physiological requirements we will use them as a base of comparison.

From experiments which we have run in our laboratory it is evident that bluegills if gradually acclimated from 77° F. to 78.8° F. can withstand temperatures between 88° F. and 92° F. The environmental conditions influence their reaction so an exact degree cannot be given. In all probability deleterious conditions would result if they were to remain indefinitely at waters over 93° F.

I would also like to point out that if they are suddenly transferred to temperatures of water varying between 88° F. and 92° F. no ill effect will probably result. If you would like experimental data to support these conclusions I shall be glad to furnish them.

Since the highest temperature that this water of the Potomac would reach if you raise the temperature of the water 15° F. would be 91° F. or 92.8° F. over a short distance, I think that one could safely say that there would be no deleterious effect to such fish as the bluegill if temperature changes occur. I think one might reasonably state that there would likewise be no deleterious effect to large-mouth bass.

The effect of temperature on the discharge water on the algae would not be noticeable unless the temperature was in excess of 95° F. Above this temperature the natural summer flora of algea which is usually dominated by green algae might be dominated by blue-green algae.

Of course, if the organic load of the river is increased enough by upstream residential developments or industries, the blue-green algae in the river would increase whether or not there is any change in temperature.

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Furthermore, I should like to point out that the taste and odor producing algae are liable to increase if a dam is erected at River's Bend. Many of the taste and odor algae are plankton forms and develop best in the slow waters behind dams. This problem will further be enhanced if the organic load of the river is increased.

Therefore if this river is dammed at River's Bend a taste and odor problem may develop during the summer months due to no other cause than the retention of the water behind the dam.

If you have any further questions concerning this, kindly let me know.

Yours sincerely,

RUTH PATRICK, *Curator of Limnology.*

GOVERNMENT OF THE DISTRICT OF COLUMBIA,
DEPARTMENT OF SANITARY ENGINEERING,
November 14, 1955.

Mr. WILLIAM P. GULLEDGE,
Counsel, Senate District Committee,
United States Capitol, Washington 25, D. C.

DEAR MR. GULLEDGE: In view of the fact that the technical case on behalf of the water system was to be presented by Col. Ray Adams, District engineer, at the hearing of the Senate subcommittee under the chairmanship of Senator Wayne Morse, I was prepared principally to endorse his views with which I was familiar beforehand. Since I did not testify orally, I should like to go on record as being in full agreement with the substance of Colonel Adams' statements before the subcommittee. Especially do I share his apprehension as to the possible detrimental effect of future industry upstream from the water intakes should its waste discharges be mingled with those from the proposed electric generating station. I am also equally concerned that the development proposed may preempt the possible future use of a water-supply dam in this stretch of the river.

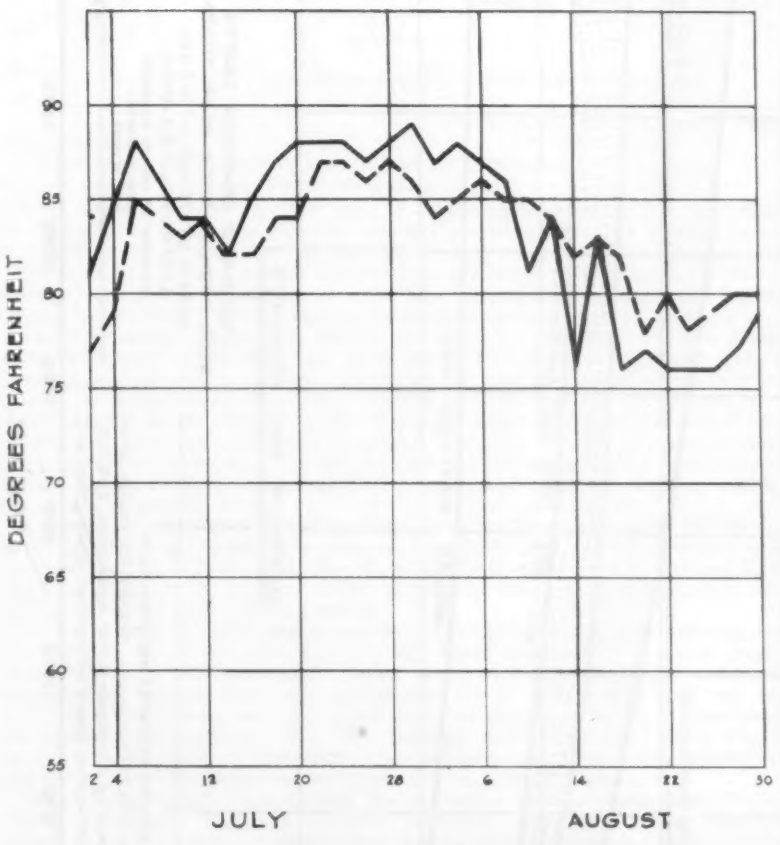
Several points of collateral interest are believed worthy of note. The self-supporting character of the water system is such that any increase in processing costs for the removal of tastes and odors will necessarily be passed on to the water consumers of the District of Columbia and Virginia. A saving to the power company and its customers which might result in more costly water treatment may well be completely offset by added costs for water to many of the same customers. There is also no assurance that with the techniques now known, that objectionable tastes and odors, if they develop, can be successfully removed from the water no matter how much might be spent to this end.

There are indications that the temperature of water in the distribution system is almost directly responsive to the temperature of the water at the filter plants so any increase in river temperature may be expected to be apparent in the distribution system. A plotting of comparative temperatures for the months of July and August 1955 illustrates this point. Any increase in the temperature of water distributed to consumers may be expected to increase the amount of water required for the operation of air-conditioning equipment throughout the city. In the hottest weather water used for air-conditioning purposes may be expected to increase up to 5 percent for each degree rise in the temperature of water in the distribution system. Since some 50 million gallons daily is used in hot weather for air-conditioning purposes, a 2° rise in the distribution system would reflect itself in about a 5 million gallon daily rise in peak water demand.

Of possible interest is a plotting of maximum-day water demands as compared with the minimum river flow of record which occurred in 1930. This would indicate that excluding supplemental irrigation and quantities required to minimize pollution effects in the lower river, the metropolitan area water requirements may equal or exceed the total quantity of water available in the river by the year 1980. Since the figures used for this plotting are based on maximum-day requirements and those presented in other testimony in the same connection are for the most part on average day requirements for Fairfax and the Washington Suburban Sanitary Commission, this information is actually not inconsistent with similar data furnished by others.

Yours very truly,

DAVID V. AULD,
Director of Sanitary Engineering.

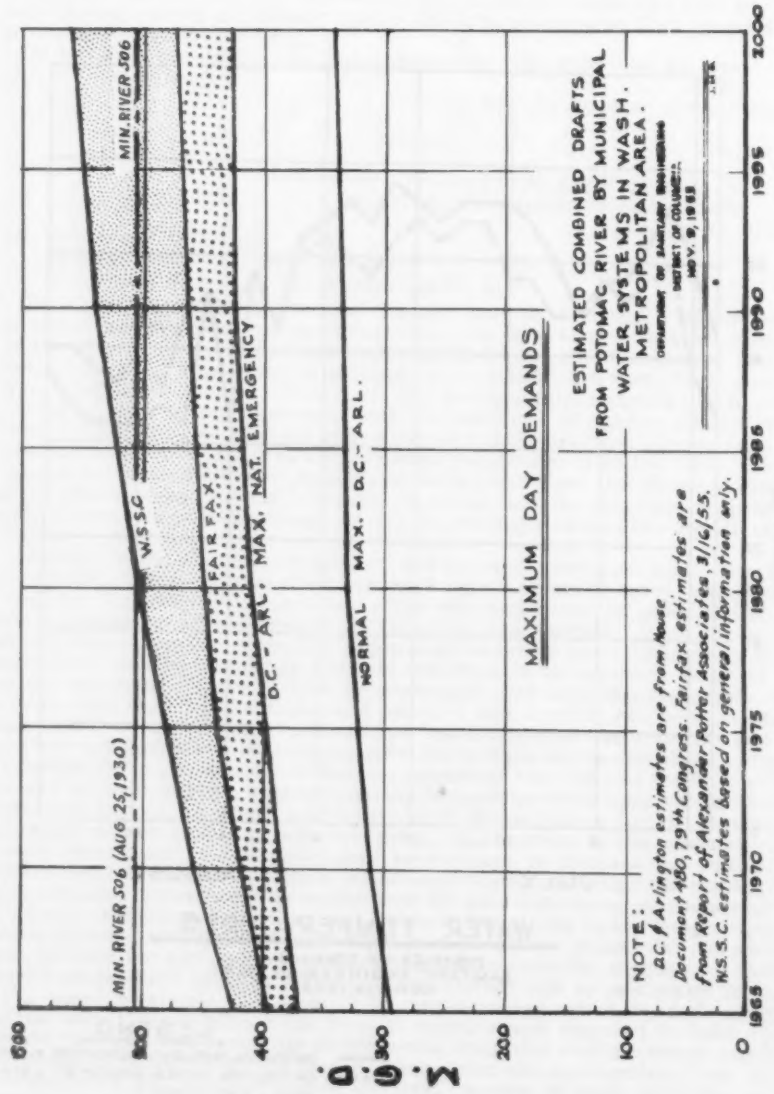


WATER TEMPERATURES

DISTRICT OF COLUMBIA
SANITARY ENGINEERING DEPT.
SEPT. 13, 1955

LEGEND

DALECARLIA (EFFLUENT) FILTRATION PLANT.
DISTRIBUTION SYSTEM-BRYANT ST. METER SHOP - 2ND HIGH.


ESTIMATED COMBINED DRAFTS
FROM POTOMAC RIVER BY MUNICIPAL
WATER SYSTEMS IN WASH.
METROPOLITAN AREA.
MAXIMUM DAY DEMANDS
MIN. RIVER 506 (AUG 25, 1930)
MIN. RIVER 506
W.S.S.C.
FAIRFAX
D.C. - ARL. MAX. NAT. EMERGENCY
NORMAL MAX. - D.C. - ARL.
NOTE:
D.C. & Arlington estimates are from House Document 480, 79th Congress. Fairfax estimates are from Report of Alexander Potter Associates, 3/16/53.
W.S.S.C. estimates based on general information only.
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[Telegram]

WASHINGTON, D. C., *November 14, 1955.*

Senator WAYNE MORSE,
Chairman, Senate District Subcommittee,
United States Capitol:

Protest Pepco location in Loudoun County as inevitable ensuing industrialization would lead to loss of park character of Potomac River Valley.

MRS. H. GABRIEL MURPHY,
President, Trowel Garden Club.

LOUDOUN COUNTY ZONING ADMINISTRATOR,
CLERK'S OFFICE,
Leesburg, Va., November 11, 1955.

Hon. WAYNE MORSE,
Chairman, Subcommittee, Senate District Committee,
Capitol Building, Washington, D. C.

DEAR SENATOR MORSE: At the hearing of your subcommittee for the District of Columbia on November 10, 1955, which I attended, Col. Ray Adams, District Engineer of the Army Corps of Engineers, was disturbed about further industrialization of the area around the Potomac & Electric Power Co. site. For the information of your committee I would like to explain how under the Loudoun County zoning laws a heavy industry is allowed to come into the county.

There is no heavy industrial district set up in the Loudoun zoning ordinance. A heavy industry is allowed only upon the procuring of a use permit from the county board of zoning appeals. Therefore all parties interested are in a position to be heard as to their views on the desirability and the effects on the neighborhood or community when applicant appears before the board at an advertised public hearing. A use permit does not rezone property it merely gives the applicant a permit to use his land for the use specified in said permit. In the case of Pepco a use permit was granted and only one property owner in the county objected.

As for more heavy industries being located in the Pepco area or on the Potomac River in Loudoun County it is extremely unlikely that further industry would be allowed and I am sure that after the evidence brought forth by Colonel Adams as to the effect on the District water supply, the board of zoning appeals would hesitate to grant any further permits.

As for growth of industries alongside the proposed 4-mile spur railroad track leading into the Pepco site, I might say there has been a railroad track in Loudoun County for many, many years. Four years ago passenger service was discontinued because there was no demand for it. Since 1942 only two small warehouses have been built along this railroad and these in small communities for agricultural supplies. The area through which this spur track will run does not lend itself to any industrial building and it is inconceivable that adjoining property owners would allow any such situation to exist.

In closing I would like to inform the committee that Loudoun County is very zoning conscious. We have an alert planning commission whose objectives, approved by the board of supervisors, are to keep Loudoun as an agricultural county as is its due according to its position as a leading county in the State as to milk, beef cattle, and grains. Also the board of zoning appeals is able, through large attendance at the zoning meetings, to keep its decisions in line with the wishes of the citizens as to whether industries will be advantageous to the neighborood, community, or county at large.

The Pepco site is not good farmland, it is isolated and should not interfere with the everyday life of the county. It is a desirable industry for Loudoun County.

I am writing this letter at the direction of Mr. H. C. Thompson, chairman of the county board of supervisors and am sending a copy to Congressman Howard W. Smith. I am also making the formal request that this letter be made a part of the subcommittee record.

Very sincerely,

(Signed) Sybil W. Wanner,
(Typed) Mrs. H. C. WANNER,
Zoning Administrator, Loudoun County.

STATEMENT PREPARED FOR A SUBCOMMITTEE OF THE DISTRICT OF COLUMBIA COMMITTEE OF THE UNITED STATES SENATE BY A GROUP OF REPRESENTATIVE CITIZENS OF LOUDOUN COUNTY, VA.

We are addressing this statement to this committee because it appears from the record that, despite the limitations on the extent of its deliberations which would seem to have been imposed by its title, an effort is being made to induce it, without giving the affected parties an opportunity to be heard, to act in matters which will—

1. Adversely affect mineowners and miners and those dependent upon them in scores of communities in a number of States far removed from the District of Columbia, including Pennsylvania, West Virginia, Virgina, Indiana, Ohio, and Kentucky.

2. Adversely affect the interests of the stockholders and engineers, firemen, hostlers, and yardmen of seven interstate railroads, including the Southern Railroad, Chesapeake & Ohio, Virginian, Norfolk & Western, Seaboard Airline, Atlantic Coast Line, Richmond, Fredericksburg & Potomac, and one intrastate railroad, the Washington & Old Dominion.

3. Adversely affect the interests of property owners in Maryland who were not advised of the broad sweep of the inquiry.

4. Shape the future of Loudoun County, Va., in a manner which will unlawfully deprive many of its citizens of their property, without compensation, in order to enrich unjustly others elsewhere.

Those of the signers below who attended the public hearing on the proposed Potomac Electric Power Co. plant wish to say at the outset that they were impressed by the fairness with which it was conducted by the chairman.

We do not hold him accountable for the fact that an inquiry into the effect of the proposed plant on the quality and quantity of the District's water supply, a matter clearly within the scope of the committee's activities, was, by a surprise maneuver, extended to embrace aspects of flood control on an interstate river, a matter we believe to be more properly within the scope of other committees of the Congress.

We do acknowledge that one aspect of the flood-control problem in the Potomac is very surely a matter of direct concern to the District of Columbia and its representatives. This is the fact that the District and its neighboring communities have, according to the statement of the committee chairman, raised the bottom of the Potomac some 12 feet by filling it with sludge, thus tending to create a bottleneck which causes the river to overflow at increasingly more frequent intervals.

We understand, too, that the rate by which this deposit is being deepened—and the river accordingly made more shallow—is being increased, rather than diminished, with new connections to the sewer system being permitted in great numbers daily. We wonder why the Army engineers who express such great concern over the purity of the Potomac and over the danger of floods do not take steps to eliminate this sludge at once, thus deepening the channel and vastly increasing the amount of water the stream bed can carry without overflowing.

Of course, we realize that this would be doing it the easy way, while building $50 million dams upstream would be more fun and more spectacular. One of the serious flaws in this dam-building process is the following: if the river level upstream is to be raised 12 feet every time the District deposits another 12 feet of sludge, then the day would come when the river would either be permanently raised above the surrounding areas of Maryland and Virginia by dikes or levees, or these same areas would be flooded over. This would be flood control indeed—by permanent flood.

Our point here is this, that it ill befits the District and Maryland, in view of their own record, to question the position of Virginia and Loudon County on stream pollution. These two political entities first mentioned have been fouling this glorious river for generations, with complete contempt for anyone downstream from them or, for that matter, with complete contempt for their Virginia neighbors directly across the Potomac. Their transgressions range from the dumping of untreated human waste and meat packers' offal into the Potomac at Washington, to the maintenance in Maryland of a pulp and paper plant at Luke. Such plants are notorious for the river-damaging nature of their wastes.

Virginia, on the other hand, has what is recognized as one of the most rigid stream pollution-control laws in the Nation. And Loudoun County, with its long Potomac riverfront, stretching from Seneca, at the Fairfax line, to Harpers Ferry, has never permitted the erection of a single industrial plant along its

shores. This, while Washington and Maryland are daily soliciting new industries to increase and diversify their already manifold outpourings into the Potomac, at their level, and at the same time attempting to deny Virginia the right to attract industry under its very strict pollution-control law.

Indeed, there is nothing in Loudoun's record to indicate that there is even a remote possibility of its permitting the establishment of any industry, near the proposed plant or elsewhere, which would result in noxious wastes entering the Potomac.

With reference to our statement that an effort is being made to deprive, unlawfully, many of our citizens of their lands, without compensation, in order to unjustly enrich others elsewhere, our position is simply this:

In the first place, we do not believe it is the manifest destiny of Loudoun County to become a satellite of Washington, and to be restricted exclusively to agricultural pursuits forever; or to be, as one District of Columbia newspaper regards us, Washington's backyard. We feel that we have a right to grow up, to become a community of diversified interests, reflecting every facet of modern American life. We further feel, on the basis of the record of the two communities, we are the better fitted to shape our own future.

We feel that to deprive us of any lawful use of our lands by regulatory fiat is an illegal partial seizure and it is particularly burdensome when the landowners of the District of Columbia and Maryland attempt, through their representatives, to prevent our obtaining the higher prices which sales to industry bring, while actively and competitively soliciting industrial purchasers for their own properties.

If some metropolitan authority wishes to preserve the Maryland and Virginia shores of the Potomac as a watershed (and at the same time destroy the historic Chesapeake and Ohio Canal) there is a traditional American way for doing it. Let this authority purchase the needed acreage from the landowners, either by negotiation or by exercise of the right of eminent domain.

Furthermore, we do not believe that there is anything sacrosanct about a program for supply water to a great city of the future which so unimaginatively envisions that city's water being carefully shepherded down the last 25 miles of the Potomac, then pumped up the high river bank to the presently hardly-more-than-adequate treated water storage facilities and then laboriously pumped back up river into the Maryland and Virginia areas into which the populations of that expanded city must inevitably spill. Maybe money will be no object in that city of the future. Maybe the Government will also get out of private business in this regard. But, surely, if money is an object, the authority responsible for providing an economical supply of water will place its treatment plants and treated water storage facilities at the top of the service areas and let the treated water flow by gravity down through the entire system.

To review briefly, before we demonstrate the more serious and immediate economic aspects of the plant location, testimony in the record of which this statement forms a part has clearly established—

1. That any heating of the Potomac waters by the condensers of the proposed plant will create no health hazards for the city of Washington.

2. The location of the plant at the Loudoun site will not prevent the erection of a River Bend Dam of a height sufficient to assure a proper water supply reserve for Washington in the future.

3. That a flood-control dam only a few feet lower than that proposed by the Army engineers could be constructed at River Bend without interfering with the Pepco plant.

4. That any decrease in the storage capacity at River Bend could be made up by the construction of "one or more dams on the tributaries of the Potomac."

5. That Pepco officials, having surveyed the field, regard the Loudoun site as 'ideal," and when they say "ideal" they mean that they can produce there, in accordance with their duty and in the judgment of their engineers, electric power more economically than they can produce it at any other site. (It can be shown, we believe, that a plant of similar capacity would cost at lest a third more elsewhere. Since their income must rise with their investment, this additional cost would be a burden on all of their customers and 85 percent of the company's revenues come from outside Montgomery County, chiefly from the District of Columbia and the District and Federal Governments.)

So much for the narrower, geographical aspects of the situation. We wish now to discuss those broader questions which we believe equal, if they do not

transcend, in importance such matters as the future of Loudoun County or the aqua pura to be available for quenching the thirst of generations as yet unconceived—except in the very active imaginations of individual Army engineers, whose headlined forebodings, "fears," and "concerns" about water supply and pollution already have been so convincingly dissolved before this committee.

With the question of pollution resolved in the company's favor, it is certain the plant will be located along one bank or the other of the Potomac River, since the waters of the river are needed for cooling purposes. If it is located in Montgomery County, Md., its production costs will be automatically higher since taxes alone will be in the order of $1,200,000 more each year. In addition there will be added construction and operational outlays at any Maryland site, for extra transmission lines and other appurtenances. These sums, while they may benefit Montgomery County taxpayers, will be paid in greatest part out of the pocketbooks of taxpayers all over the Nation, who meet the Government's large payments to the company, and out of the pocketbooks of District of Columbia residents, residents who are a matter of direct concern to this committee.

If it is located in Maryland, too, the company will to a large degree lose its present ability to control its operating costs. This is because the plant would be economically tied to a single railroad and to the coalfields served by that railroad. It thus will lose the benefits of competition in a large degree, since southern miners, southern mineowners, southern railroads and southern railroad workers will be unable to compete with their northern contemporaries at the proposed Maryland sites.

We believe that superior benefits would accrue to the company and its customers if it were permitted to continue to enjoy the advantages at its new plant it now enjoys at its existing plants. Freight rates from the northern and southern fields, for example, are about equal at its present plants in the District of Columbia. In view of this, coal mine prices must be competitive if Pepco's business is to be retained.

In addition to the economic advantages which thus accrue to Pepco's customers, there is also the factor that the company's continuity of supply is less susceptible to interruption. For example, a strike on a single railroad, or in a single coalfield, cannot cut off the flow of coal to the company's boilers.

Surely no member of the United States Government, with its vast establishment in Washington, should want to do anything to destroy the company's advantage in this regard, particularly when its critical importance to the national-defense effort is taken into consideration. Indeed, it would seem in our judgment that the Government and its elected representatives, even including the respected Senator from Maryland, would wish to put national interest above local interest in this regard.

Now, let us examine the situation which we believe investigation by any competent inquirer would reveal as likely to result if the plant were built at the Loudoun site. At the proposed Maryland sites, as we have pointed out, one railroad and the coalfields it serves would get virtually all the business. But, as between North and South, the North would still retain an advantage in freight rates, though a lesser one, in Loudoun because the Loudoun site is nearer the northern fields.

So that railroad which would wholly benefit from the selection of a Maryland site would, with the coalfields it serves, continue to get a very substantial portion of the business of the new plant. But not all. Another northern railroad—and the northern coalfields it serves—would probably also appear in the overall picture.

But what is more, the southern railroads we have already mentioned, as well as the southern coalfields, would also share in the business at the new plant. And all the time the plant would be located at the site which its owners have pronounced to be ideal, the site which the company's own engineers have selected as being the one at which they could produce power for its customers most economically, and at the location most desirable from the standpoint of national defense.

By our laws against primogeniture and perpetuities we have demonstrated as a people our feeling that the dead hand of the past should not be allowed to control the future. In the light of the facts above submitted, facts which we believe will bear the light of the most intense scrutiny, we humbly suggest that there should also be a limit at which the future should be stopped short from interfering with the affairs of the present.

In our judgment, no sound arguments, but only strawmen, have been advanced to interfere with the selection of the Loudoun site.

We respectfully urge that every member of the subcommittee and the full committee do everything in his power to aid the company in securing the site of its choice.

The undersigned wish to state that they sign this document solely as individuals, any information appearing with their names being for the purpose of identification only; and that in the preparation of this presentation they did not consult with officials of the Potomac Electric Power Co. in any manner.

(Signer, address, and identification:)

J. M. Hughes, Sterling, Va., dairy farmer.
J. Emory Kirkpatrick, Ashburn, Va., member, county board of supervisors.
Sybil Warner, Sterling, Va., zoning administrator.
Thomas B. Hutchinson, Leesburg, Va., commissioner of revenue.
M. J. Martz, Leesburg, Va., clerk of court.
J. T. Hirst, Leesburg, Va., member, county board of supervisors elect.
Albert F. Anderson, mayor of Purcellville, Va.
S. Reed Galleher, Leesburg, Va., county treasurer.
Sterling M. Harrison, Commonwealth's attorney for Loudoun County.
Carlton Penn, Leesburg, Va., attorney.
J. R. H. Alexander, Leesburg, Va., judge, 26th circuit court, retired.
Robert T. Cochran, editor, Loudoun Times-Mirror.
M. A. Ankers, Sterling, Va., dairyman, near site.
George H. Page, Sterling, Va., merchant.
E. C. Page, Sterling, Va., service manager, Douglas Ford.
W. C. Poland, Ashburn, Va., farmer.
A. L. Crosen, Sterling, Va., merchant.
E. M. Solomon, Ashburn, Va., farmer.
C. C. Kirkpatrick, Ashburn, Va., farmer.
A. E. Hofferberth, Ashburn, Va., dairyman.
F. M. Sheffield, Ashburn, Va., dairyman.
Hattie E. Conner, Ashburn, Va., dairyman.
John W. Conner, Ashburn, Va., dairyman.
Jerome Bailey, Sterling, Va., student.
H. M. Horseman, Ashburn, Va., farmer.
A. L. Hummer, Sterling, Va., farmer.
Clarence Caylor, Ashburn, Va., truckdriver.
J. E. Solomon, Ashburn, Va., farmer.
C. Lester Solomon, Ashburn, Va., farmer.
C. H. Creel, Sterling, Va., farmer.
Mrs. Mary L. Crosen, Sterling, Va., merchant.
W. C. Davis, Ashburn, Va., farmer.
R. N. Campbell, Sterling, Va., merchant.
Roland C. Cochran, Sterling, Va., farmer.
F. L. Jennings, Sterling, Va., contractor.
C. J. Fletcher, Ashburn, Va., miller.
W. J. Hayes, Ashburn, Va., farmer.
C. M. Partlow, Ashburn, Va., merchant.
M. S. Norman, Ashburn, Va., farmer.
M. L. Partlow, Ashburn, Va., merchant.
Nelson Partlow, Ashburn, Va., merchant.
Lester E. Fletcher, Ashburn, Va., miller.
C. R. Fletcher, Ashburn, Va., farmer.
R. L. Fletcher, Lovettsville Va. farmer.
R. T. Howser Jr., Ashburn, Va., C. & P. Telephone Co.
Robert L. Forman, Arcola, Va., farmer.
John H. Hanes, Ashburn, Va., merchant.
Clem D. Robey, Ashburn, Va., farmer.

WASHINGTON, D. C., *November 14, 1955.*

Hon. WAYNE MORSE,
The United States Senate,
Washington, D. C.

DEAR SIR: We shall thank you to have this statement made part of the record of the hearing held on November 10 by the subcommittee, of which you are

chairman, of the District Senate Committee with respect to the location of the proposed new $100 million powerplant of the Potomac Electric Power Co.

We regret the erroneous impression that has been created in the public mind that it will cost Pepco more to generate electricity at a plant located in Montgomery County than one in Loudoun County and that its customers will have to pay for such inefficient operation through higher rates for their electricity.

The primary reasons given for this alleged situation, as reported by the press and others following interviews with Pepco officials, are: (1) that there are no sites topographically suited for an economic powerplant operation on the Maryland side of the Potomac, (2) that taxes are too high in Montgomery County as compared with Loudoun County, and (3) that coal costs will be considerably higher for a plant located in Montgomery County than for one in Loudoun County.

Evidence that we have obtained from our investigations does not in any respect justify these conclusions. Competent engineers whom we have consulted have stated that sites do exist in Montgomery County on the Potomac River which are suitable for an economic powerplant operation—and we have ascertained that sites are available. Plant locations on such sites would be above present flood stages of the river as well as the maximum water level of the proposed dam at River Bend for the impoundment of future water supply for the Washington area and for flood control.

It has been erroneously reported that taxes in Montgomery County will be double those in Loudoun County—that the plant will pay $750,000 in taxes annually in Loudoun County and $1,500,000 annually in Montgomery County. Mr. M. L. Reese, the county manager of Montgomery County, has stated that the $100 million plant would pay taxes to the county of between $750,000 and $1 million annually. On the other hand, the $660,000 taxes annually that were claimed for Loudoun County at the hearing of the board of zoning appeals at Leesburg on September 14 if the plant (then believed to represent a $72 million investment) were established there, would, when related to the $100 million investment now contemplated, be increased to $918,000 annually. It appears therefore, that at the most, the increased taxes on a plant in Montgomery County would be relatively nominal.

Further, the claim was made that fuel costs will be $500,000 more if the plant were built in Montgomery County rather than in Loudoun County. To shed light on this issue and refute such claim, we attach herewith, as part of our statement, a letter from the Fairmont Coal Bureau which shows that, considering all reasonable possibilities, coal could be delivered to a plant in the Monocacy River area of Montgomery County for $583,805 less per year than it could be delivered to one in Loudoun County.

From the beginning of the Pepco issue, the citizens we represent have objected to the location of the proposed powerplant in the so-called Seneca Lake area of the Potomac River. This area, historically farming, has been changing as the Washington metropolitan area has been expanding, into rural medium to high-level residential use. Our investigations have convinced us beyond doubt that the establishment of the Pepco plant in this area will be quickly followed by a determined effort on the part of the syndicate from which Pepco obtained its option on its 519-acre site and at least 4 other landowners to industrialize approximately 5,000 acres which they own around the plant on both sides of the Potomac. This effort will start on the Virginia side and then leapfrog across the river to the Maryland side.

We are amazed at and completely disagree with the position Pepco now takes, as stated by their counsel at your hearing, that they no longer have a moral or legal obligation to aid the owners of the adjoining 1,000 acres from whom they obtained their option, to cooperate with and assist them in their efforts to obtain industrial zoning for their land. Pepco bases this on the fact that said owners did not make an application for such zoning change at the same time Pepco made their application for a special use permit to establish their plant on their optioned land. Paragraphs 9b and 12 of the option contract, dated August 3, 1955, introduced by Pepco into the record on November 10, do not set any time limit for the fulfillment of the obligations Pepco assumed thereunder.

On or about October 27, when these key provisions were made known by the press about 6 weeks after Pepco's request for industrial use of their land under option had been granted, there was no question raised that the language was not clear and unequivocal and that Pepco had not obligated itself to support future

efforts to industrialize the adjoining 1,000 acres. At that time, Mr. Bisset, senior vice president of Pepco, is reported to have explained to the Evening Star newspaper, "That the cooperation proviso was written into the agreement at the insistence of the Triple Seven Syndicate." Mr. Bisset said the syndicate insisted on the cooperation clause "even though we told them we would not oppose any efforts to develop their property for industrial use." He said further and significantly, "It remains to be seen in just what way we can help them to that end." It is apparent that Mr. Bisset entertained no doubt at that time that the obligations referred to were continuing obligations of Pepco's and were valid and binding upon them at whatever time the owners of the adjoining land might determine to apply for the industrial rezoning of their land. And, as stated, we have reports which convince us that said owners will so apply.

We are of the opinion that the development of an industrial area on both sides of the Potomac at this location will jeopardize the esthetic and recreational values of the upper Potomac River Valley and seriously mar the beautiful backdrop for our Nation's Capital that it has long been considered.

Further, we are convinced that such industrialization, because of heavy trucking over the highways in the area, smoke from the burning of soft coal (Pepco's plant alone will consume about 100 cars of soft coal a day), and other adverse factors incident to the industrial use of land, will seriously depreciate property values in a wide area along a 25-mile stretch of the Potomac River from Cabin John to White's Ferry.

As counsel for duly authorized representatives of a substantial number of Montgomery County citizens interested in both purchasing their electricity at the lowest possible rates resulting from efficient operation of the company, with a fair financial return to it, and in having Pepco establish its new plant in the county, for tax revenue and other reasons, on the Potomac River not too far downstream from the mouth of the Monocacy River, where it will do the least violence to existing conditions (metropolitan Washington's water supply, property values, recreational use of the upper Potomac River Valley, and fish life in the river) we deem it our duty to present this statement for your record.

Very truly yours,

GEORGE C. WARNER, Jr.,
Counsel for the Citizens' Committee To Bring Pepco's Proposed $100 Million Powerplant to Montgomery County.

FAIRMONT COAL BUREAU,
New York 17, N. Y., November 13, 1955.

Vice Adm. R. S. RIGGS (U. S. N. Retired),
Chairman, Citizens' Committee To Bring Pepco's Proposed $100 Million Powerplant to Montgomery County, Md.,
Washington, D. C.

DEAR ADMIRAL RIGGS: As your committee is aware, my attention was first called to the matter of the cost of coal delivered to the site under option by Pepco in Loudoun County for its proposed new powerplant as compared with a possible one in Montgomery County, on the Potomac River near the mouth of the Monocacy River, by an article which appeared in the Sunday issue of the Washington Post on October 9, 1955.

This article, based largely upon an interview with Mr. Bisset, senior vice president of Pepco, while only quoting comparative prices per ton for southern West Virginia coal delivered to each site, nevertheless left the clear impression that Pepco could save $500,000 annually on its coal purchases if it built its proposed plant in Loudoun County rather than in Montgomery County, and that such saving was one of the reasons Pepco favored the Loudoun County site. This article completely ignored the fact that, based upon presently approved rates, coal from northern West Virginia fields can be purchased by Pepco for a plant in the Monocacy area for substantially less than the cost of southern West Virginia coal delivered to the Loudoun County site.

This erroneous impression was again given in an article appearing in the Evening Star under date of October 25, when it was reported that a member of a committee of the Allied Civic Group of Silver Spring, Inc., which had consulted with Pepco officials, stated that "the utility estimates it would cost 50 cents per ton more to bring coal to the proposed $100 million powerplant if the installation was erected in Montgomery County, rather than at the Virginia site." If the claimed saving is related to the million and a half tons of coal per year that a 600,000-kilowatt plant will conservatively consume, the amount would equal $750,000 annually. As stated above, almost the opposite is true.

In the data I gave to your comittee on October 27, published in a newspaper article on October 31, I showed a saving in favor of the Monocacy area of $841,000 annually.

Subsequently, in an article appearing the Evening Star on November 1, 1955, an official of the Washington & Old Dominion Railroad "disputed a claim that coal could be delivered cheaper to a site in Montgomery County near Dickerson" than to a site in Loudoun County. He said there had been failure to "take into consideration all of the coal freight rate adjustments proposed to the Loudoun County site" and stated further that such proposed coal freight rate adjustments were "from northern fields to the Loudoun site."

Now, if we consider coal freight rates other than those presently established—namely, "proposed" or "reasonably possible" adjustments to present rates—the comparison I arrived at previously would be revised downward, but it would still show a lower cost in favor of the Monocacy area over the Loudoun County site of $583,805.

In making this analysis of fuel costs, based upon reasonably possible freight rate adjustments from all available fields, I have tried to be completely realistic by assuming the viewpoint of Pepco in their position as consumer, endeavoring to obtain the best available value for their fuel dollar, in the best interest of its customers.

Here is how I arrived at my conclusions:

1. For coal delivered to the Loudoun site from southern West Virginia, Pepco will have to pay $9.39 per ton. For 1,500,000 tons, this will amount to $14,085,000. The southern coal has a heat value of 14,200 B. t. u.'s per pound.

Generally, northern West Virginia coal is not quite as high in B. t. u. value as southern West Virginia coal. Hence, for coal from northern West Virginia (Fairmont and Preston County) equal in B. t. u. value to the 1,500,000 tons of southern coal delivered to the Loudoun site, I have estimated purchases at proposed costs as follows: 25 percent or 400,350 tons of coal with a heat value of 13,300 B. t. u.'s per pound, at $8.50 per ton, amounting to $3,402,975; 25 percent or 394,500 tons of coal with a heat value of 13,500 B. t. u.'s per pound, at $8.36 per ton, amounting to $3,298,020 and the remaining 50 percent or 783,000 tons of coal with a heat value of 13,600 B. t. u.'s per pound, at $8.50 per ton, amounting to $6,655,500. Thus, the total tonnage to equal the B. t. u. value of the southern coal is 1,577,850 tons, and the total cost is $13,356,495.

Because of some additional cost of handling the ash and pulverizing northern coal, an amount of $33,450 should be added to the cost as above, arrived at as follows: 1.12 cents per ton or $17,672 for ash handling and 1 cent per ton or $15,778 for pulverizing. Thus, the total comparative cost of northern coal is $13,389,945. Therefore, northern coal can be delivered to the Loudoun site for $695,055 less than southern coal.

2. It is reasonably possible that coal can be delivered to the Monocacy area from southern West Virginia at the same price per ton as that charged for delivery to the Loudoun site, namely, $9.39. Hence, for 1,500,000 tons the cost will be $14,085,000. As stated this coal has a heat value of 14,200 B. t. u.'s per pound.

Hence, for coal delivered to the Monocacy area from northern West Virginia (Fairmont and Preston County) equal in B. t. u. value to the southern coal I have estimated purchases at reasonably possible costs as follows: 25 percent of the total B. t. u. requirements, or 400,350 tons of coal with a heat value of 13,300 B. t. u.'s per pound, at $8.13 per ton, amounting to $3,254,845; 25 percent, or 394,500 tons of coal with a heat value of 13,500 B. t. u.'s per pound, at $7.99 per ton, amounting to $3,152,055; and the remaining 50 percent, or 783,000 tons of coal with a heat value of 13,600 B. t. u.'s per pound, at $8.13 per ton, amounting to $6,365,790. Thus, as with deliveries to Loudoun County, the total tonnage to equal the B. t. u. value of the southern coal is 1,557,850 tons, and the total cost delivered at the Monocacy area is $12,772,690. Adding a penalty of $33,450 for the cost of handling the ash and pulverizing the northern coal, as was done in comparing this cost with southern coal, both delivered to the Loudoun site, we have a total comparative cost of northern coal of $12,806,140. Northern coal can, therefore, be delivered to the Monocacy site for $1,278,860 less than southern coal.

3. It will be seen from the above that northern coal can be delivered to either the Loudoun or Monocacy sites cheaper than southern coal can be delivered, and, using proposed or reasonably possible adjustments to present freight rates, that northern coal can be delivered to the Monocacy site for $583,805 less than

northern coal can be delivered to the Loudoun site ($13,356,495 minus $12,772,690 equals $583,805).

Your committee can be assured that this analysis of comparative costs is based upon facts and consideration of reasonably possible freight-rate adjustments in all cases.

Sincerely yours,

CARL A. MARSHALL,
Managing Director.

MEMORANDUM FROM COLONEL ADAMS IN RE LOW STREAMFLOWS

Reference is made to the statement of Mr. Powell to the effect that streamflow conditions of the Potomac River are at a low stage such as to affect temperature of the water supply only a few days a month. An analysis of the records of streamflow at Point of Rocks from 1910 to 1955 does indicate that on an average the occurrence of flows below 1,000 cubic feet per second at the Seneca Dam would be for about 3 days a year. On the other hand, looking at the individual years we find the following distribution and concentration of such low flows:

Number of days flows less than 1,000 feet per second

Year:	*Days*
1931	54
1930	45
1932	16
1924	16
1915	8
1914	4
1933	3
1923	3
1917	2
1925	1
1922	1
Total	[1] 153

[1] Average $\frac{153}{49}=3.1$ days.

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